Appendix F-3

Preliminary Hydrology Report

FUSCOE
ENGINEERING

Gateway Village

PRELIMINARY HYDROLOGY REPORT

City of Irvine, CA

Prepared for:

BROOKFIELD RESIDENTIAL, LLC
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Prepared by:

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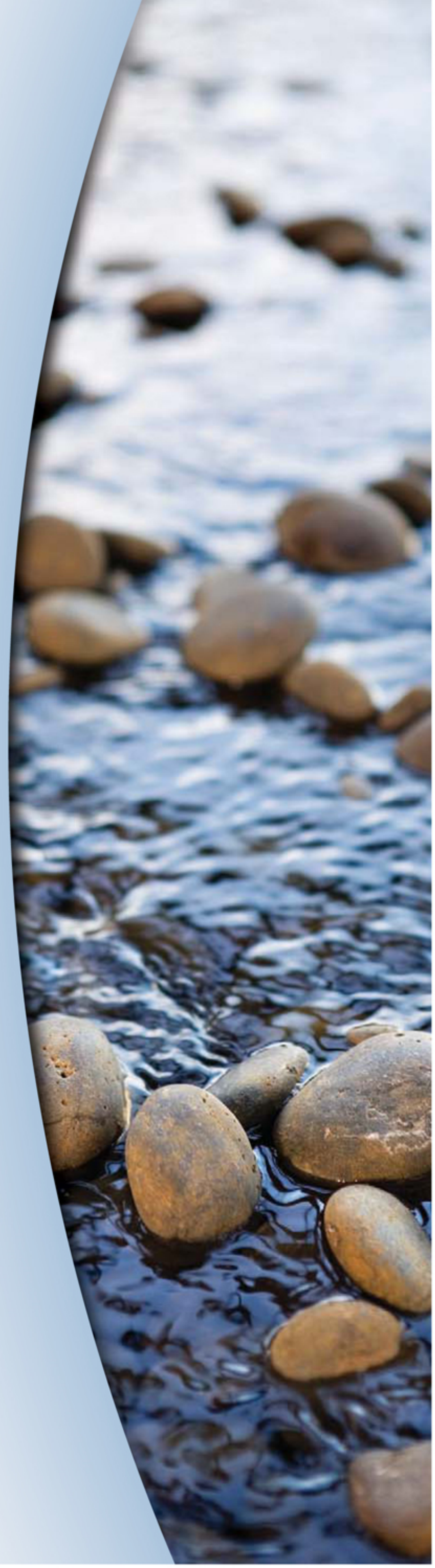
Project Manager:
John Olivier, PE

Supervising Engineer:
Craig Kwasniewski, PE

December, 2024

Job Number: 308-092-01

full circle thinking®



Gateway Village

PRELIMINARY HYDROLOGY REPORT

Prepared by:

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December 2024

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1.0 INTRODUCTION

1.1 Project Description:

Brookfield Homes, partnering with the City of Irvine, has proposed a new 116.9-acre residential village with 1,360 residential units, called Gateway Village (the proposed project), in the City of Irvine (City), California. The project would also include development of parks, a community garden, paseos, associated roadway infrastructure, and an extension of the Jeffrey Open Space Trail (JOST) east from Portola Parkway for approximately (2,750 feet) at the entrance to the forthcoming Gateway Preserve. Brookfield Homes would develop the residential village on 65.5 acres, and the City would develop the JOST and a community park on 14.4 acres. Density ranges for different residential development areas will range from 10-22 dwelling units per acre at the lowest density to 30-40 dwelling units per acre at the highest density.

The project site is located in North Irvine, at the northeast corner of Portola Parkway and Jeffrey Road. The site is bounded by Portola Parkway to the south, Jeffrey Road/Hicks Haul Road to the west, and Bee Canyon Access Road to the east. Hicks Canyon Wash is to the north. See Figure 1, Vicinity Map.

1.2 Purpose:

The purpose of this hydrology report is to identify and evaluate any potential stormwater impacts associated with the proposed development of the Gateway Village project, and to recommend strategies to mitigate said impacts. Stormwater impacts are generally defined as increased peak design flow rates caused by proposed development above existing peak flow rates (or above expected flow rates) at a common node where runoff leaves the site, and/or, increased hydromodification flow rates caused by the proposed development above existing hydromodification flow rates at a common node where runoff leaves the site. The results and recommendations evaluated in this report will be presented in the project Environmental Impact Report (EIR). The main purpose of an EIR is to inform public agency decision makers and the public about potential environmental impacts (if any) caused by the project. The EIR will be used by the City, as the lead agency under the California Environmental Quality Act (CEQA), in making decisions with regard to the proposed project described herein and the related drainage approvals required for the project.

2.0 EXISTING SITE CONDITIONS

2.1 Topography, Drainage Patterns, and Land Uses:

The project site consists primarily of active agricultural fields with equipment storage and laydown areas in the northern portion of the site. The current City General Plan designation for the project site is Recreation, which would change with this application. The topography on the upper third of the site generally drains by surface ditch (2 ditches) in a southwest direction toward Jeffrey Road at a gradient of 3.5 percent. This upper third site tributary is part of the larger East Hicks Canyon watershed which originates offsite and upstream of the project site. The City is planning for the development of a separate project called the Gateway Preserve, which would create a 700 acre open space preserve in the hills above North Irvine and include the Ease Hicks Canyon watershed area. This action would assure that offsite flows originating upstream and passing through the Gateway Village project site will remain natural. The two upper tributary ditches terminate at Jeffrey Road where they are collected by an existing storm drain in Jeffrey Road.

The topography on the lower two thirds of the site generally drains in a southerly direction toward Portola Parkway, with a moderate gradient of 2.5 to 3 percent. At Portola Parkway, the lower two thirds flow is collected by two existing storm drain pipes, one on Portola Parkway midway between Jeffrey Road and Bee Canyon Road and one at the intersection of Portola Parkway and Bee Canyon Road.

2.2 Existing Storm Drain Facilities:

Six existing drainage facilities exist around the perimeter of the project site (see Exhibit x), and include,

a) Hicks Canyon Facility F27 in Jeffrey Road, a 102” mainline drain and associated laterals L10 (Drain D) and L12 (Drain C),
b) AD 07-22 36”and 48” drains in Portola Parkway (Drain F),
c) AD 07-22 36” drain at Portola Parkway/Bee Canyon Road intersection (Drain E),
d) 36” drain crossover in Bee Canyon Road (Drain D1),
e) 30” drain in Bee Canyon Road (Drain Y) (N.A.P.),
f) 51”drain crossover in Bee Canyon Road (Drain Z) (N.A.P.).

Under existing conditions, drains C, D, D1, E, and F, receive runoff from project site areas and will continue to do so under proposed conditions. Drain Y collects runoff from areas due east of Bee Canyon Road but does not collect or convey site flows. Drain D1 crosses Bee Canyon Road approximately 3,400 feet north of the intersection of Portola Parkway and Bee Canyon Road and conveys runoff from natural areas east of Bee Canyon Road into the project site. For purposes of discussion in this report, Drain C will connect to the F27 lateral L12 at POC1, Drain D will connect to the F27 lateral L10 at POC2, Drain E will connect to the AD 07-22 36” drain at POC 3 near the intersection of Portola Parkway and Bee Canyon Road, and Drain F will connect to the AD 07-22 36” drain at POC4 on Portola Parkway midblock between Jeffrey Road and Bee Canyon Road. Existing hydrology maps were obtained for Drains C, D, E, and F to determine if design flow Q25 allowable threshold flow rates were previously established for any of the four drains. The hydrology map for Drains E and F, *Exhibit 2, Offsite Hydrology Map for Rough Grading, TT16927-PA-9B, PA-9C, Phase 1, City of Irvine, Hunsaker and Associates, 6/28/06*, was the only map with Q25 information and was used to establish Q25 threshold flow rates for those drains, 93.3cfs at Drain F, and 62.8cfs at drain E, respectively. The Hunsaker Map can be found in Appendix 10.

3.0 HYDROLOGY

3.1 Storm Frequency and Methodology:

Hydrologic calculations were prepared for existing and proposed conditions throughout the site to establish baseline storm flow rates at project watershed exit points C, D, E, and F described in the paragraph above, and to compare existing condition design peak flow rates versus proposed condition design peak flow rates to determine peak flow rate mitigation needs. Hydrologic sub-watersheds C, D, E, and F were established to delineate areas draining to each POC. Hydrologic calculations were not prepared for sub-watershed areas A17a and A17b as those areas were previously programmed to drain into Facility F27 and Gateway Village improvements will not change that. Per Orange County Hydrology Manual (Ref. xx) and per the City of Irvine Standards (Ref. xx), a 25-year frequency storm event was selected for design peak flow rate evaluation because sump conditions are present onsite. The existing and proposed conditions were analyzed utilizing the Advanced Engineering Software (AES) package for Orange County (RATSCX) (Ref. xx). Rational Method analysis was used because the total watershed area is less than 1 square mile (640-acres) in size. Nodal point location determination focused on key mainline storm drain confluence locations and point of connection locations. Storm drain lateral and catch basin locations were given low priority. AES hydrologic calculations for existing and proposed conditions can be found in Section xx.

3.2 Proposed Storm Drain Facilities:

a) Sub-Watershed C: A storm drain (pass through drain) will be provided in 'C' Street to intercept off-site flows and convey them to POC-1. The pipe will be sized to convey 25-year peak flows and does not require peak flow mitigation. The remainder of sub-watershed C flows (onsite flows) will be collected and conveyed to the park site for water quality treatment. Hydrology results (see Table 1) indicate proposed 2-year hydromod flow rates are less than existing 2-year hydromod flow rates, thereby 2-year flow rate attenuation is not necessary. Hydrology results (see Table 2) also indicate that proposed 25-year peak flow rates are marginally higher than existing 25-year peak flow rates by 0.1 percent so detention mitigation will not be considered on the C drain. After water quality treatment, the drain will be connected to the pass through drain.

b) Sub-Watershed D: Drainage D originates offsite and east of Bee Canyon Road, crosses Bee Canyon Road in an existing 36" RCP pipe, outlets to the surface approximately 100 feet west of Bee Canyon Road and travels on the surface to POC 2. In the proposed condition, a drain will be connected to the existing 36" pipe outlet, undergrounded, and conveyed to POC 2. The pipe will be sized to convey Q25 peak flow rate. Onsite Area D sub-watershed tributary areas will be collected and conveyed to a detention basin (underground tank) where Q25 peak flow mitigation (difference between existing and proposed Q25 flow rates) will be performed. Approximately 87.9 cfs Q25 peak flow rate will be conveyed to the proposed detention basin which will release 80.0 cfs during a 25-year storm event. The structure will require 17,500 cubic feet of storage (see Table 2). The reduced flow will be connected back to the pass through drain.

c) Sub-Watershed E: A proposed storm drain will originate at the intersection of 'B' and 'D' Streets and traverse south in 'D' Street to the southeast corner of the project site and collect Sub-Watershed E runoff along the way. The pipe will be sized to convey Q25 flows. A proposed detention basin (underground tank) will be provided at the southeast corner location where 25-year peak flow mitigation will be required. Approximately 167.9 cfs Q25 will be conveyed to the proposed detention basin which will release 64.5 cfs during a 25-year storm event. The structure will require 190,575 cubic feet of storage (see Table 2). The reduced flow will be connected to an existing 36" RCP pipe at the corner of Portola Parkway and Bee Canyon Road (POC 4).

d) Sub-Watershed F: Drainage F consists of a short piece of storm drain in 'E' Street which collects runoff from the street and from Sub-Watershed F (a single lot). The storm drain connects to a 36" RCP in Portola Parkway mid-block between Jeffrey Road and Bee Canyon Road. The connection point is labeled POC 3. As-built plans for the existing 36" drain reveal a threshold Q25 value of 93.3 cfs at this location. Existing condition hydrology indicates a Q25 flow rate of 44.0 cfs at this location. Proposed condition hydrology indicates a Q25 flow rate of 18.9 cfs at this location (see Table 2). Because the proposed flow rate is less than the threshold rate and the existing flow rate, Q25 peak flow mitigation is not required for this drain.

3.3 Hydromodification:

The proposed Gateway Village project site ultimately drains 5 miles downstream to the Upper Newport Bay via the San Diego Creek Channel and those receiving waters are susceptible to hydrologic conditions of concern (HCOC's). As such, per City of Irvine requirements, and per the adopted Watershed Infiltration and Hydromodification Management Plan (WIHMP) guidelines, the project is required to mitigate either the excess runoff volume (by retention) or the excess runoff flow rate (by detention) from a 2-year rain event if excess' are present. Soil testing on the site indicates the soils have very low percolation capabilities and cannot infiltrate stored water within a 48 hour period, thus flow rate detention of the post-development 2-year peak flow rate to within 110% of the pre-development flow rate is the appropriate method of mitigation if excess' are present. Accordingly, each of the four project site watersheds (C, D, E, and F) have been evaluated for 2-year peak flow mitigation with results shown in Table 2.1.

Table 2.1 shows that proposed condition 2-year flow rates exceed 110% of existing condition 2-year flow rates in sub-watersheds C, D, and E. Mitigation has been added to sub-watersheds D and E in the form of underground concrete vaults with outlet control to reduce outbound 2-year flow rates to acceptable levels. Flow attenuation was not provided for sub-watershed C because existing and proposed 2-year flow rates are only marginally different. The underground vaults will simultaneously serve to reduce proposed condition 25-year design peak flow rates to existing/threshold levels. Basin routing calculations for 2-year and 25-year can be found in Appendix 6.

4.0 HYDROLOGY RESULTS

4.1 Design Flow Rate Q25 Results:

As described throughout this report, the subject property will encompass four separate sub-watersheds C, D, E, and F and storm runoff from each sub-watershed will leave the project site and immediately connect to four individual receiving drains at point of connection (POC) locations 1 ,2 ,3 , and 4 (see Figure 3). Hydrology calculations have been prepared at a 25-year frequency for each sub-watershed with results being used to evaluate mitigation needs. Mitigation needs for Q25 design peak flow rate are defined as proposed 25-year flow rates exceeding existing 25-year flow rates or allowable 25-year flow rate thresholds (if applicable) at each POC location. Results of the 25-year hydrology modeling shows proposed 25-year flow rates exceed existing 25-year flow rates and/or threshold flow rates at POC locations in sub-watershed areas C, D, and E and mitigation is required to reduce 25-year flow rates to existing levels in those sub-watersheds. Proposed 25-year flow rates do not exceed existing 25-year flow rates at POC 4 in sub-watershed F and sub-watershed F flow rates do not require mitigation. Mitigation for non-compliant sub-watersheds D and E will be the inclusion of an underground detention basin (underground tank) which will provide peak flow reduction via storage and outflow control in the tank. Mitigation will not be provided for sub-watershed C based on the small percentage increase of proposed flow rate over existing flow rate (less than 1%). Table 2.2 summarizes hydrology results for the 25-year flow rate analysis for existing, proposed pre-mitigation, and post-mitigation conditions. See Appendices 7 and 8 for hydrology map supporting documents and Appendices 9 and 10 for hydrology calculation supporting documents.

5.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

5.1 CEQA Compliance:

In accordance with CEQA Appendix G environmental checklist guidelines, the following questions from Paragraph X.c) are addressed herewith in support of Environmental Impact Report (EIR) compliance.

X.c.) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream bed or river or through the addition of impervious surfaces, in a manner, which would:

i) result in substantial erosion on- or offsite.

Answer: Proposed drainage patterns will substantially mimic existing condition drainage patterns in size and in coarse as evidenced by size and position of POC connections at the project perimeter (see hydrology maps). Two existing streams traversing through sub-watersheds C and D will be replaced by underground pipe conduit further reducing the potential for erosion on the site. Finally, as with most developments, land use conditions will be altered and will generally become less pervious while at the same time reducing the potential for erosion.

ii) substantially increase the rate or the amount of surface runoff in a manner that would result in flooding on- or offsite.

Answer: Proposed site runoff will increase over existing conditions but will be captured and conveyed onsite in underground conduit (sized for Q25 conveyance per City requirements) to it's mitigation location or it's POC location or both. If necessary, Q25 and/or Q2 runoff rates will be reduced to existing condition flow rates or to receiving pipe threshold rates by detention basin routing implementation so that runoff leaving the site matches existing Q25 rates or is within 110% of existing Q2 rates. Flooding will not occur onsite with Q25 underground conduit conveyance in place and with allowance of street flow for Q100 differences. Flooding will not occur offsite due to this project based on flow rate match at perimeter POC locations.

iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial sources of polluted runoff.

Answer: See answer about drainage system capacity in Item ii) above.

Table 1: 2-Year Storm Hydromodification Compliance Summary

Watershed/POC	Ex. Hydrology Node	Ex. Q_2 Rate (cfs)	110% Ex. Q_2 (cfs)	Prop. Hydrology Node	Prop. Q_2 Pre-Mitigation Rate (cfs)	Detention Basin Storage (cf)	Prop. Q_2 Post-Mitigation (cfs)	Post-Mitigation Exceedance (%)	Meets Compliance
C / 1 (c,d)	213	3.1	3.4	215	2.5	None	None	81%	Yes
D / 2 (c,d)	313	6.3	6.9	317	12.1	17,500	6.7	106%	Yes
E / 3 (a,b)	25	25.1	27.6	27	71.5	190,575	27.4	109%	Yes
F / 4 (a,b)	15	15.6	17.2	5	8.3	None	None	53%	Yes

a) See Appendix 7, Ex. Condition 25-Year Storm Hydrology Map
b) See Appendix 8, Prop. Condition 25-Year Storm Hydrology Map
c) See Appendix 9, Ex. Condition 2-Year Hydromod Map for Watersheds 'C' & 'D'
d) See Appendix 10, Prop. Condition 2-Year Hydromod Map for Watersheds 'C' & 'D'

Table 2: 25-Year Storm Peak Flow Rate Summary

Watershed/POC	Ex. Hydrology Node	Ex. Q_{25} Rate (cfs)	Prop. Hydrology Node	Prop. Q_{25} Pre-Mitigation Rate (cfs)	Storage (cf)	Prop. Q_{25} Post-Mitigation (cfs)	Post-Mitigation vs. Ex. Q_{25} (%)	Meets Compliance
C / 1 (a,b)	210	316.5	214	319.3	None	None	101%	Yes
D / 2 (a,b)	310	83.0	315	87.9	17,500	80.0	96%	Yes
E / 3 (a,b)	25	69.9	27	167.9	190,575	64.5	92%	Yes
F / 4 (a,b)	15	44.0	5	18.9	None	None	43%	Yes

a) See Appendix 7, Ex. Condition 25-Year Storm Hydrology Map
b) See Appendix 8, Prop. Condition 25-Year Storm Hydrology Map

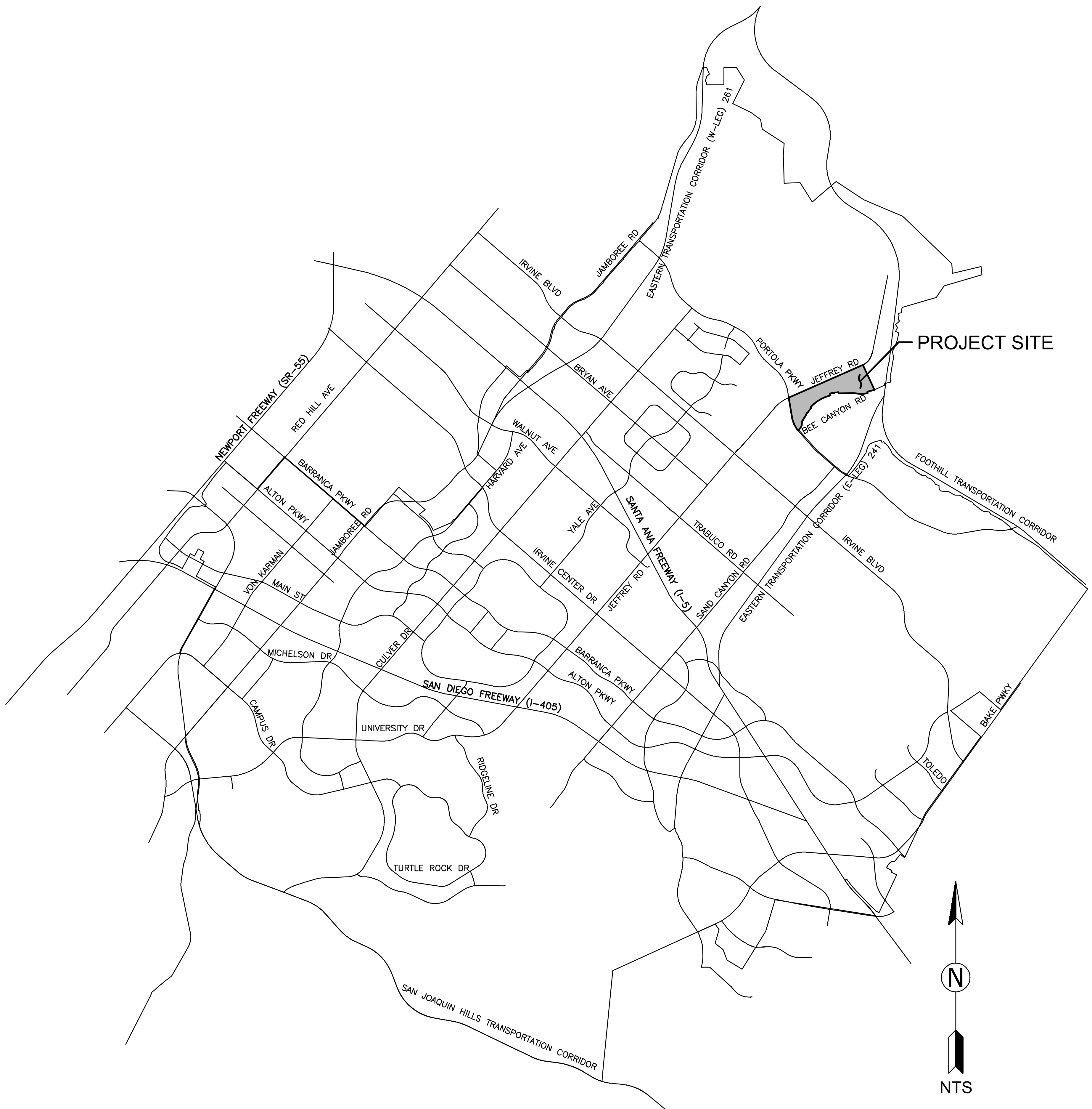
6.0 REFERENCES

6.1 References

- City of Irvine Standards & Design Manual
- Orange County Hydrology Manual
- Jefferey Road Extension Hydrology / Hydraulics Report for Project # 00810743-MCE, prepared by Wilson Mikami, September 2019
- Offsite Hydrology Map for TT 16927 – PA-9B, PA-9C2 prepared by Hunsaker and Associates, June 2006.
- Advanced Engineering Software (AES) RATSCX, 2016
- California Environmental Quality Act (CEQA) Manual, City of Irvine, Vol. II, April 2020

APPENDIX 1

Figures 1-5



Brookfield Residential

GATEWAY VILLAGE | December 2024

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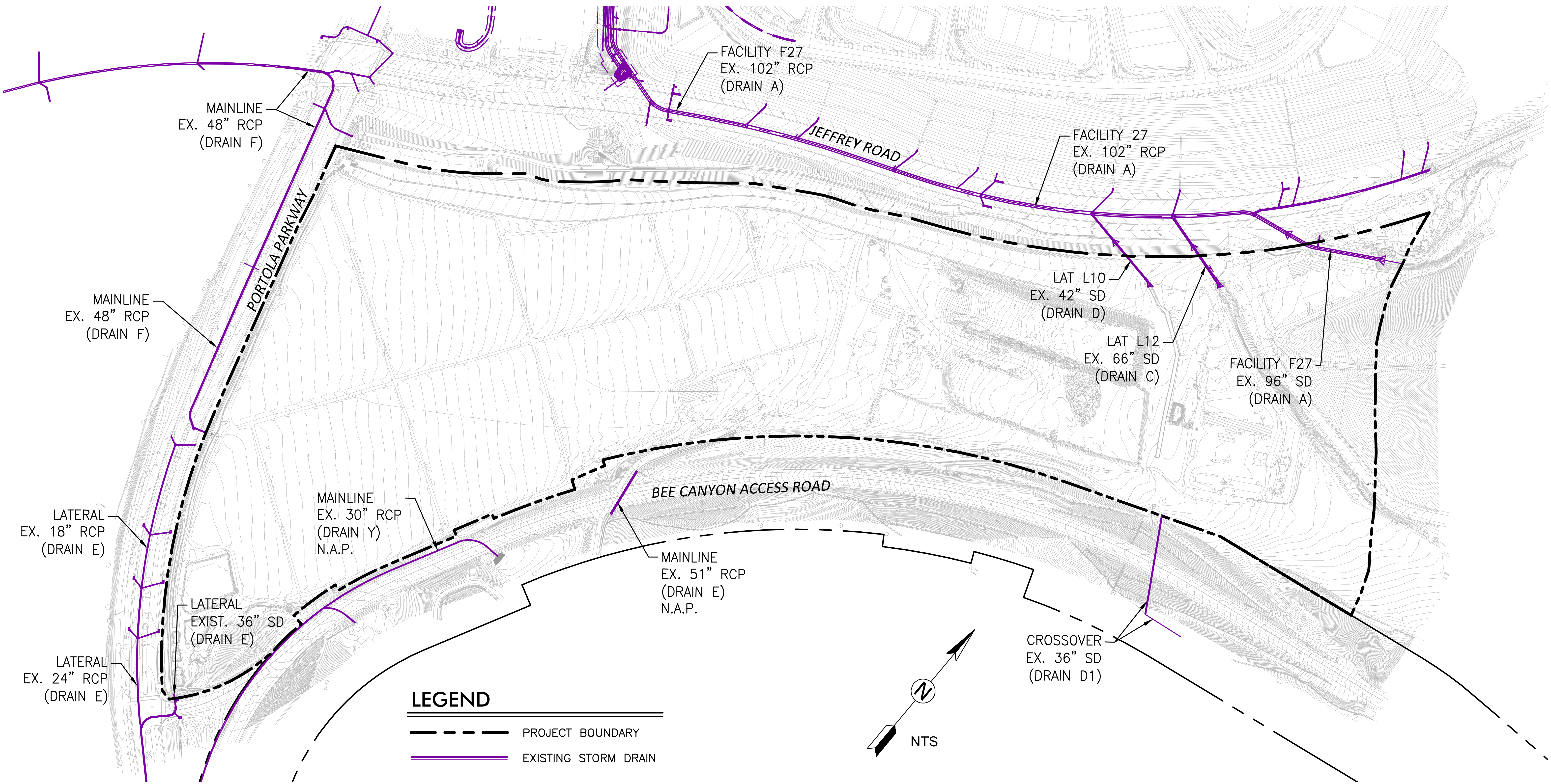
FIGURE 1
VICINITY MAP

F:\Projects\308\092_Support Files\Reports\Hydrology\Preliminary Hydrology\Exhibits\308-092-XH-Fig 1 Vicinity Map.dwg (12/3/2024) Plotted by: Michelle Pendoza



Brookfield Residential

CITY OF IRVINE 1971

FUSCOE ENGINEERING

GATEWAY VILLAGE | December 2024

FIGURE 2
EXISTING STORM DRAIN FACILITIES

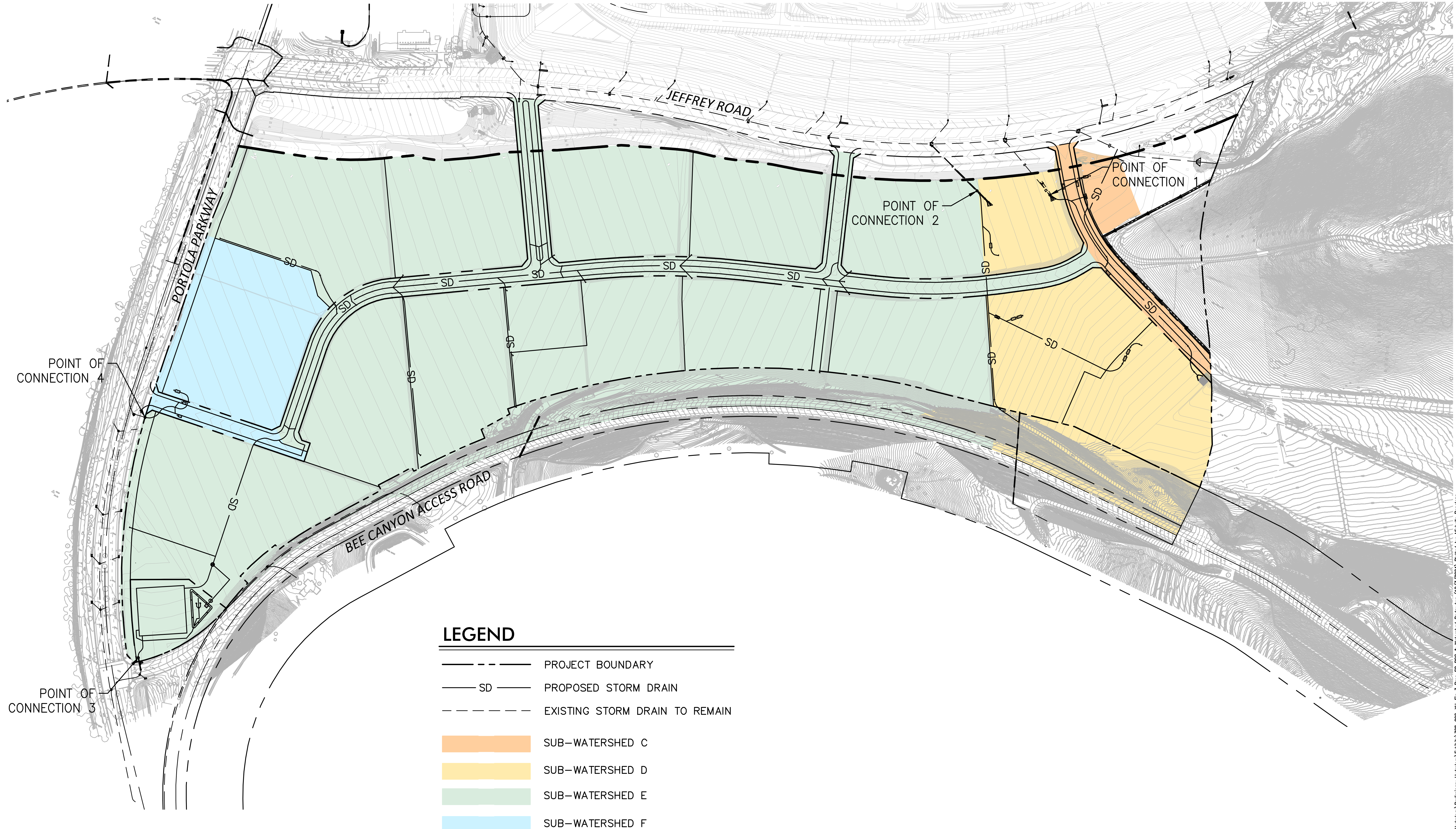


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FIGURE 3

SD POC & WATERSHED BOUNDARIES

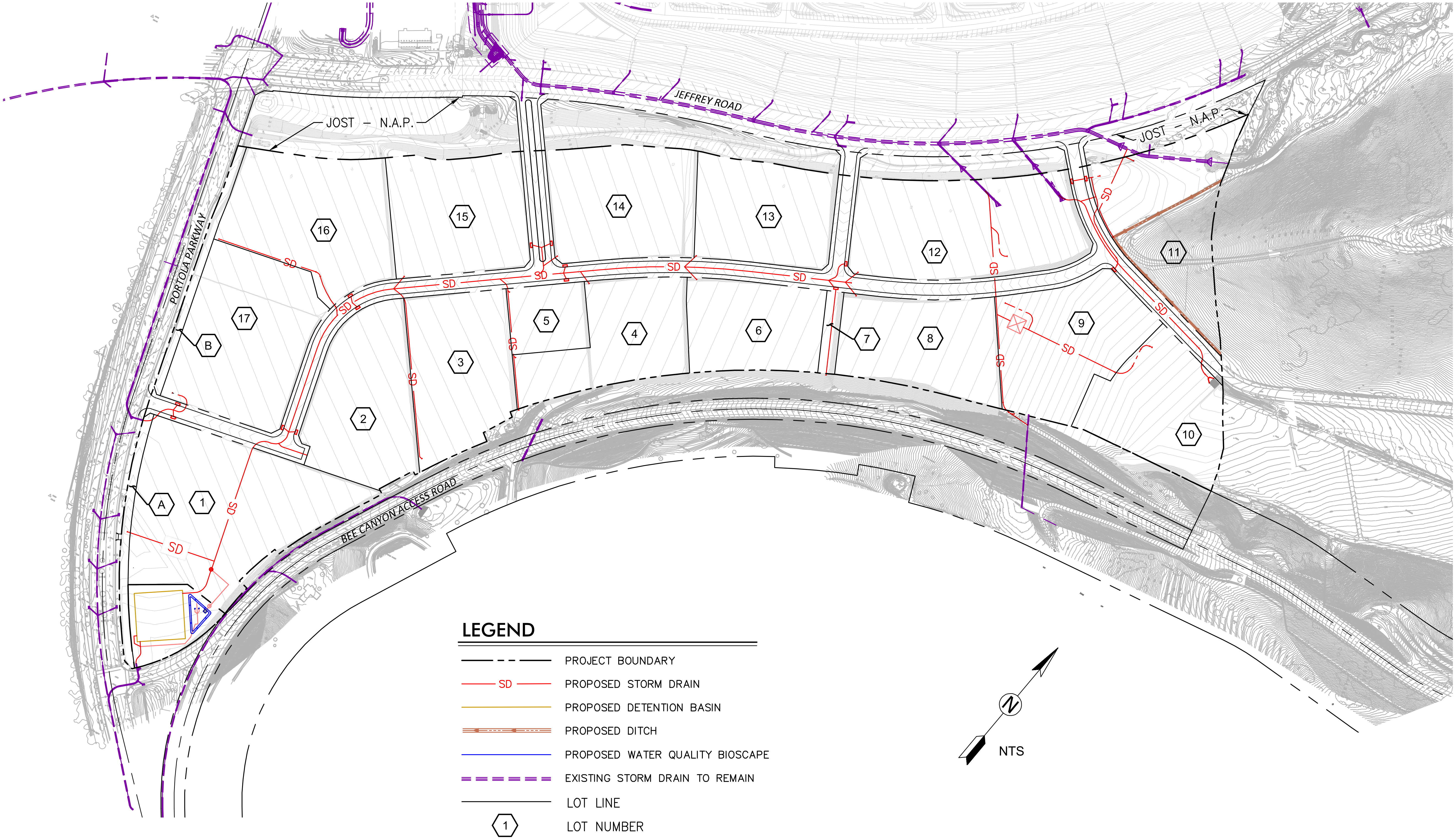

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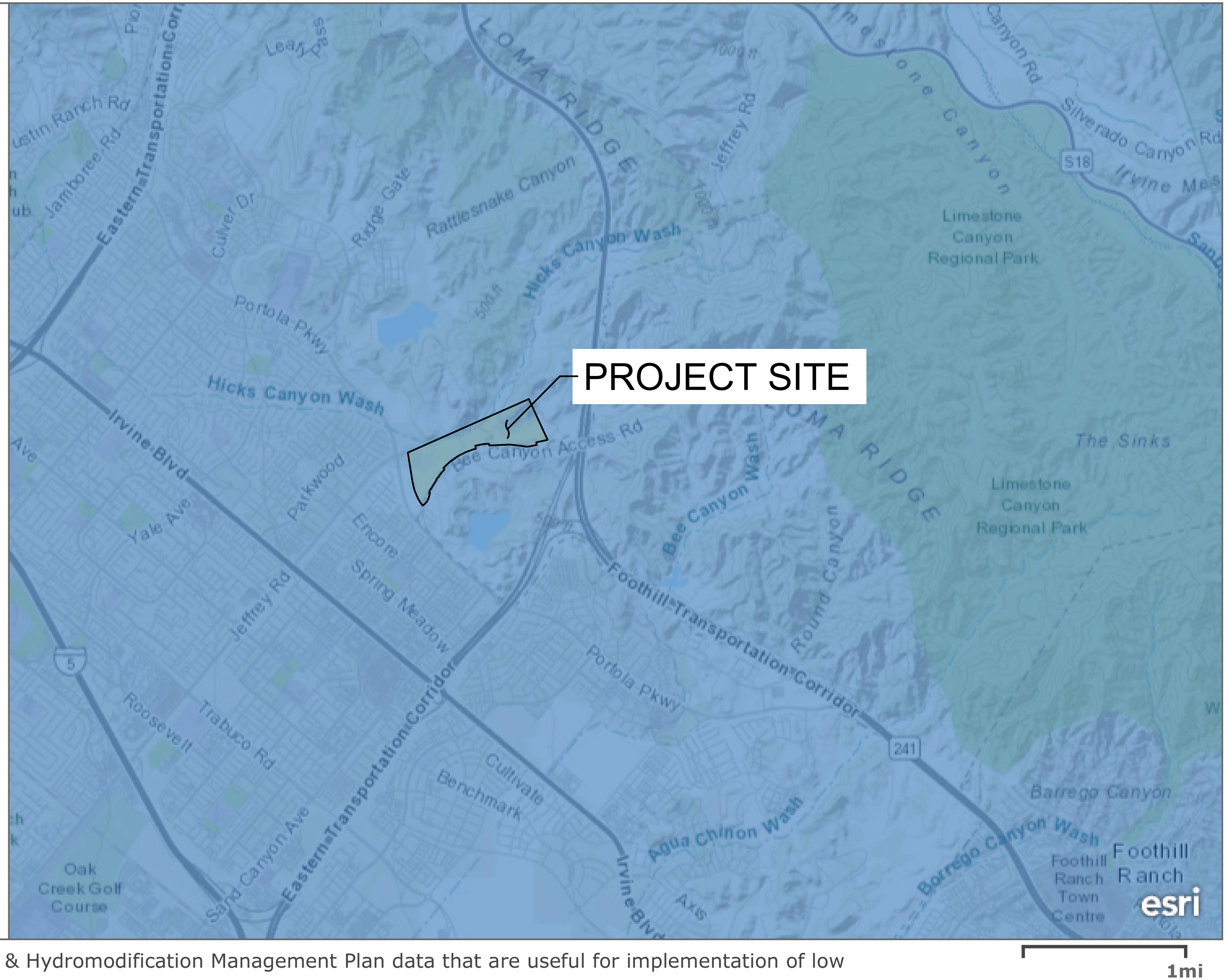
FIGURE 4
PROPOSED STORM DRAIN FACILITIES

Watershed Infiltration & Hydromodification Management Plan (WIHMP)

WIHMP_Dataset - Susceptibility



(WIHMP) Watershed Infiltration & Hydromodification Management Plan data that are useful for implementation of low impact development (LID), indentification of hydromodification conditions of concern (HCOC), and watershed planning.

City of Irvine, County of Los Angeles, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA

Brookfield Residential

GATEWAY VILLAGE | December 2024

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FIGURE 5
HYDROMODIFICATION SUSCEPTIBILITY MAP

APPENDIX 2

Existing 2-Year Storm AES Calculations

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                           Analysis prepared by:





 ************************** DESCRIPTION OF STUDY **************************
 * GATEWAY VILLAGE EXISTING CONDITION                                       *
 * WATERSHED 'C' 2 YEAR HYDROMOD                                            *
 * 12/5/24 JZ                                                               *
 **************************************************************************

  FILE NAME: GVCEX2.DAT
  TIME/DATE OF STUDY: 08:59 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    429.50  DOWNSTREAM(FEET) =    421.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.111
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.200
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL FAIR COVER
 "OPEN BRUSH"               A        0.50      0.40     1.000    28   15.11
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.70      0.30     1.000    46   15.11
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      0.93
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      0.93

****************************************************************************
 FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    421.50  DOWNSTREAM(FEET) =    410.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   556.00   CHANNEL SLOPE =  0.0207
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.069
 SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               A        0.70      0.40     1.000    28
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        2.80      0.30     1.000    46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.32
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.11
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.74
 AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   3.38
 Tc(MIN.) =   18.49
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    2.36
 EFFECTIVE AREA(ACRES) =      4.70     AREA-AVERAGED Fm(INCH/HR) =   0.33
 AREA-AVERAGED Fp(INCH/HR) =   0.33  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        4.7         PEAK FLOW RATE(CFS) =      3.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   3.07
 LONGEST FLOWPATH FROM NODE    211.00 TO NODE    213.00 =     886.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        4.7  TC(MIN.) =     18.49
 EFFECTIVE AREA(ACRES) =      4.70  AREA-AVERAGED Fm(INCH/HR)=  0.33
 AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap = 1.000
 PEAK FLOW RATE(CFS)   =       3.14
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
*****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE EXISTING CONDITION                                        *
* WATERSHED 'D' 2 YEAR HYDROMOD                                             *
* 12/5/24 JZ                                                                *
 **************************************************************************

  FILE NAME: GVDEX2.DAT
  TIME/DATE OF STUDY: 08:48 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    425.00  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.153
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH"              A       2.10      0.40     1.000    28   14.15
NATURAL FAIR COVER
"OPEN BRUSH"              C       3.50      0.25     1.000    59   14.15
NATURAL FAIR COVER
"OPEN BRUSH"              D       0.20      0.20     1.000    67   14.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =      4.92
TOTAL AREA(ACRES) =      5.80   PEAK FLOW RATE(CFS) =      4.92

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.90  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   437.00   CHANNEL SLOPE =  0.0089
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.123
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              A       2.10      0.40     1.000    28
  NATURAL FAIR COVER
  "OPEN BRUSH"              B       0.50      0.30     1.000    46
  NATURAL FAIR COVER
  "OPEN BRUSH"              C       0.30      0.25     1.000    59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.59
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   2.81
  Tc(MIN.) =   16.97
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      8.70     AREA-AVERAGED Fm(INCH/HR) =   0.32
  AREA-AVERAGED Fp(INCH/HR) =   0.32  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        8.7         PEAK FLOW RATE(CFS) =       6.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   2.63
  LONGEST FLOWPATH FROM NODE    311.00 TO NODE    313.00 =     767.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        8.7  TC(MIN.) =     16.97
  EFFECTIVE AREA(ACRES) =      8.70  AREA-AVERAGED Fm(INCH/HR)=  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.32  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =       6.25
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:
```

EXISTING 2-YEAR FOR WATERSHEDS 'B', 'E', & 'F'

```
 ************************* DESCRIPTION OF STUDY *************************
* GATEWAY VILLAGE                                                          *
* 2-YEAR STORM EVENT - EX. CONDTION                                        *
* 2024-12-05                                                               *
 **************************************************************************

  FILE NAME: GV2EX.DAT
  TIME/DATE OF STUDY: 16:36 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    361.20  DOWNSTREAM(FEET) =    353.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.800
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.455
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
AGRICULTURAL POOR COVER
"ROW CROPS,STRAIGHT ROW"   B        0.20      0.30     1.000    64   10.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =      0.21
TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.21

****************************************************************************
FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    353.50  DOWNSTREAM(FEET) =    346.50
CHANNEL LENGTH THRU SUBAREA(FEET) =   228.00   CHANNEL SLOPE =  0.0307
CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.327
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
AGRICULTURAL POOR COVER
"ROW CROPS,STRAIGHT ROW"   B        0.30      0.30     1.000    64
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.02
AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   1.88
Tc(MIN.) =   12.68
SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.28
EFFECTIVE AREA(ACRES) =      0.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   2.21
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     533.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   346.50  DOWNSTREAM(FEET) =   344.00
FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       0.46
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.75
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     562.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    425.70  DOWNSTREAM(FEET) =    420.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.323
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.416
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.10      0.25     1.000    75   11.32
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    53   11.32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    420.20  DOWNSTREAM(FEET) =    396.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   529.00   CHANNEL SLOPE =  0.0454
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.270
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.40      0.25     1.000    75
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.80      0.40     1.000    53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   2.36
  Tc(MIN.) =   13.69
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      3.50     AREA-AVERAGED Fm(INCH/HR) =   0.29
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   4.09
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    396.20  DOWNSTREAM(FEET) =    387.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   454.00   CHANNEL SLOPE =  0.0203
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.165
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        5.10      0.25     1.000    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.40
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   2.22
  Tc(MIN.) =   15.91
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    4.20
  EFFECTIVE AREA(ACRES) =      8.60     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =       6.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    387.00  DOWNSTREAM(FEET) =    361.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1087.00   CHANNEL SLOPE =  0.0237
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.014
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.50      0.40     1.000    53
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   B        2.50      0.30     1.000    64
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        3.50      0.25     1.000    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.18
  AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   4.33
  Tc(MIN.) =   20.24
  SUBAREA AREA(ACRES) =     6.50       SUBAREA RUNOFF(CFS) =    4.29
  EFFECTIVE AREA(ACRES) =     15.10     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.1         PEAK FLOW RATE(CFS) =      10.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   4.26
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.20  DOWNSTREAM(FEET) =    337.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1249.00   CHANNEL SLOPE =  0.0193
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.944
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   B        3.40      0.30     1.000    64
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        7.00      0.25     1.000    75
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.72
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   2.70
  Tc(MIN.) =   22.94
  SUBAREA AREA(ACRES) =    10.60       SUBAREA RUNOFF(CFS) =    6.44
  EFFECTIVE AREA(ACRES) =     25.70     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       25.7         PEAK FLOW RATE(CFS) =      15.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   7.99
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    3614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   298.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.30  DOWNSTREAM(FEET) =    413.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.520
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.30      0.25     1.000    75    9.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.80  DOWNSTREAM(FEET) =    391.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0285
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
```

```
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.301
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        5.60      0.25     1.000    75
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.70
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   3.60
  Tc(MIN.) =   13.12
  SUBAREA AREA(ACRES) =     5.80       SUBAREA RUNOFF(CFS) =    5.46
  EFFECTIVE AREA(ACRES) =      7.10     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =       6.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   4.12
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =    1098.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    391.00  DOWNSTREAM(FEET) =    377.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   707.00   CHANNEL SLOPE =  0.0198
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        6.70      0.25     1.000    75
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.10      0.40     1.000    53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.93
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   3.00
  Tc(MIN.) =   16.12
  SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =     13.90     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       13.9         PEAK FLOW RATE(CFS) =      11.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   4.12
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    377.00  DOWNSTREAM(FEET) =    365.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   469.00   CHANNEL SLOPE =  0.0256
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.094
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        6.40      0.25     1.000    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.75
  AVERAGE FLOW DEPTH(FEET) =   0.98   TRAVEL TIME(MIN.) =   1.65
  Tc(MIN.) =   17.76
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    4.86
  EFFECTIVE AREA(ACRES) =     20.30     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      15.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =   4.87
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =    2274.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    365.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1896.00   CHANNEL SLOPE =  0.0158
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.974
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C       16.80      0.25     1.000    75
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        1.80      0.40     1.000    53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.99
  AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   3.95
  Tc(MIN.) =   21.71
  SUBAREA AREA(ACRES) =    18.60       SUBAREA RUNOFF(CFS) =   11.88
  EFFECTIVE AREA(ACRES) =     38.90     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.26  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       38.9         PEAK FLOW RATE(CFS) =      25.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.23   FLOW VELOCITY(FEET/SEC.) =   8.35
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    4170.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       38.9  TC(MIN.) =     21.71
  EFFECTIVE AREA(ACRES) =     38.90  AREA-AVERAGED Fm(INCH/HR)=  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =      25.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 3

Existing 25-Year Storm AES Calculations

WILSON MIKAMI AES RUN FOR WATERSHED 'C'

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                           15535 Sand Canyon Ave
                                 Suite 100
                              Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
* EXISTING WATERSHED TRIBUTARY TO 102" SD FACILITY "F27"                   *
* 25-YEAR HYDRAULIC RUN                                                    *
* BY KAM 011819                                                            *
 **************************************************************************

  FILE NAME: EX25YR.DAT
  TIME/DATE OF STUDY: 16:13 11/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    745.00  DOWNSTREAM(FEET) =    680.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.386
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.377
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.80      0.25     1.000    77    9.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    680.00  DOWNSTREAM(FEET) =    608.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   984.00   CHANNEL SLOPE =  0.0732
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.991
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.70      0.25     0.100    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        5.00      0.25     1.000    77
  COMMERCIAL                 D        0.90      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.60      0.20     1.000    83
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.697
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.31
  AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   2.24
  Tc(MIN.) =   11.63
  SUBAREA AREA(ACRES) =    10.70       SUBAREA RUNOFF(CFS) =   27.09
  EFFECTIVE AREA(ACRES) =     11.50     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =       11.5         PEAK FLOW RATE(CFS) =      29.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   8.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    1284.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    608.00  DOWNSTREAM(FEET) =    510.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1446.80   CHANNEL SLOPE =  0.0677
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.662
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        1.60      0.40     1.000    46
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.20      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        5.70      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.07
  AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   2.66
  Tc(MIN.) =   14.29
  SUBAREA AREA(ACRES) =    11.50       SUBAREA RUNOFF(CFS) =   24.56
```

```
  EFFECTIVE AREA(ACRES) =     23.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =       23.0         PEAK FLOW RATE(CFS) =      50.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.33   FLOW VELOCITY(FEET/SEC.) =   9.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    2730.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  16
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
============================================================================
  USER-SPECIFIED CONSTANT SOURCE FLOW =    77.00(CFS)
  USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW =    23.01(ACRES)
  * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =    77.00  AREA(AC.) =    23.01
  * SUMMED DATA: FLOW(CFS) =   127.22    TOTAL AREA(ACRES) =    46.01

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    510.00  DOWNSTREAM(FEET) =    445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1835.40   CHANNEL SLOPE =  0.0354
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   4.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.401
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        8.20      0.40     1.000    46
  COMMERCIAL                 B        4.80      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       17.80      0.30     1.000    66
  COMMERCIAL                 C        1.20      0.25     0.100    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               C       38.00      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       20.30      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.940
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     214.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.68
  AVERAGE FLOW DEPTH(FEET) =   2.59   TRAVEL TIME(MIN.) =   2.86
  Tc(MIN.) =   17.15
  SUBAREA AREA(ACRES) =    90.30       SUBAREA RUNOFF(CFS) =  174.99
  EFFECTIVE AREA(ACRES) =    113.30     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   0.92
  TOTAL AREA(ACRES) =      113.3         PEAK FLOW RATE(CFS) =     219.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.92   FLOW VELOCITY(FEET/SEC.) =  11.61
  * TOTAL SOURCE FLOW(CFS) =       77.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    4566.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1533.20   CHANNEL SLOPE =  0.0228
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
```

```
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   4.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               A        7.40      0.40     1.000    46
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        7.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               C        4.10      0.25     1.000    77
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        3.60      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     315.90
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.99
 AVERAGE FLOW DEPTH(FEET) =   3.25   TRAVEL TIME(MIN.) =   2.56
 Tc(MIN.) =   19.71
 SUBAREA AREA(ACRES) =    22.20       SUBAREA RUNOFF(CFS) =   38.19
 EFFECTIVE AREA(ACRES) =    135.50     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   0.94
 TOTAL AREA(ACRES) =      135.5         PEAK FLOW RATE(CFS) =     239.46

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.25   FLOW VELOCITY(FEET/SEC.) =  10.00
 * TOTAL SOURCE FLOW(CFS) =      77.00
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    6099.40 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      135.5  TC(MIN.) =     19.71
 EFFECTIVE AREA(ACRES) =    135.50  AREA-AVERAGED Fm(INCH/HR)=  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap = 0.936
 PEAK FLOW RATE(CFS)   =     239.46
 * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =      77.00  AREA(AC.) =       23.0
 * SUMMED DATA: FLOW(CFS) =     316.46    TOTAL AREA(ACRES) =      158.5
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                           Analysis prepared by:

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                             Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
 * EXISTING WATERSHED TRIBUTARY TO 102" SD FACILITY "F27"                  *
 * 25-YEAR HYDRAULIC RUN NODE D                                            *
 * BY KAM 011819                                                           *
 **************************************************************************

  FILE NAME: WMEX25.DAT
  TIME/DATE OF STUDY: 17:01 11/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                  --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    620.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.882
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL FAIR COVER
 "OPEN BRUSH"              C        0.20      0.25     1.000    77   11.88
 NATURAL FAIR COVER
 "OPEN BRUSH"              D        0.20      0.20     1.000    83   11.88
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      0.98
 TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    430.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2812.10   CHANNEL SLOPE =  0.0676
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"              C       17.20      0.25     1.000    77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.14
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
 AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   6.47
 Tc(MIN.) =   18.35
 SUBAREA AREA(ACRES) =    17.20       SUBAREA RUNOFF(CFS) =   31.91
 EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.25
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      32.66

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   8.49
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    3112.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   425.00
 FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.88
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.66
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   18.47
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    3227.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              C       17.20      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   17.20      SUBAREA RUNOFF(CFS) =   31.77
  EFFECTIVE AREA(ACRES) =     34.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.8       PEAK FLOW RATE(CFS) =      64.29

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   422.00
  FLOW LENGTH(FEET) =   313.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.29
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   18.96
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    308.00 =    3540.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    422.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   766.00   CHANNEL SLOPE =  0.0157
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.137
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              D       13.70      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.06
  AVERAGE FLOW DEPTH(FEET) =   2.05   TRAVEL TIME(MIN.) =   2.11
  Tc(MIN.) =   21.07
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   23.89
  EFFECTIVE AREA(ACRES) =     48.50     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.24  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       48.5         PEAK FLOW RATE(CFS) =      83.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.11   FLOW VELOCITY(FEET/SEC.) =   6.21
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =    4306.10 FEET.
============================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        48.5  TC(MIN.) =      21.07
  EFFECTIVE AREA(ACRES) =      48.50  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =      83.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                           Analysis prepared by:
```

EXISTING 25-YEAR FOR WATERSHEDS 'B', 'E', & 'F'

```
 ************************* DESCRIPTION OF STUDY *************************
* GATEWAY VILLAGE                                                          *
* 25-YEAR STORM EVENT - EX. CONDITION                                      *
* 2024-12-5 JZ                                                             *
 **************************************************************************

  FILE NAME: GV25EX.DAT
  TIME/DATE OF STUDY: 15:44 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    361.20  DOWNSTREAM(FEET) =    353.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.800
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.119
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 AGRICULTURAL POOR COVER
 "ROW CROPS,STRAIGHT ROW"   B        0.20      0.30     1.000    81   10.80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    353.50  DOWNSTREAM(FEET) =    346.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   228.00   CHANNEL SLOPE =  0.0307
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.902
 SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 AGRICULTURAL POOR COVER
 "ROW CROPS,STRAIGHT ROW"   B        0.30      0.30     1.000    81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.58
 AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.47
 Tc(MIN.) =   12.27
 SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.70
 EFFECTIVE AREA(ACRES) =      0.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   2.75
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     533.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   346.50  DOWNSTREAM(FEET) =   344.00
 FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.73
 ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.17
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.33
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     562.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    425.70  DOWNSTREAM(FEET) =    420.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.323
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.037
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.10      0.25     1.000    88   11.32
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    72   11.32
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    420.20  DOWNSTREAM(FEET) =    396.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   529.00   CHANNEL SLOPE =  0.0454
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.40      0.25     1.000    88
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.80      0.40     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.69
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.88
  Tc(MIN.) =   13.20
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    4.91
  EFFECTIVE AREA(ACRES) =      3.50     AREA-AVERAGED Fm(INCH/HR) =   0.29
  AREA-AVERAGED Fp(INCH/HR) =   0.29  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       7.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.13
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    396.20  DOWNSTREAM(FEET) =    387.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   454.00   CHANNEL SLOPE =  0.0203
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        5.10      0.25     1.000    88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.32
  AVERAGE FLOW DEPTH(FEET) =   1.01   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =   14.95
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   10.76
  EFFECTIVE AREA(ACRES) =      8.60     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      18.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   4.67
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =    1278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    387.00  DOWNSTREAM(FEET) =    361.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1087.00   CHANNEL SLOPE =  0.0237
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.310
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.50      0.40     1.000    72
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   B        2.50      0.30     1.000    81
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        3.50      0.25     1.000    88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.32
  AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   3.41
  Tc(MIN.) =   18.36
  SUBAREA AREA(ACRES) =     6.50       SUBAREA RUNOFF(CFS) =   11.87
  EFFECTIVE AREA(ACRES) =     15.10     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.1         PEAK FLOW RATE(CFS) =      27.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.29   FLOW VELOCITY(FEET/SEC.) =   5.51
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    2365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.20  DOWNSTREAM(FEET) =    337.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1249.00   CHANNEL SLOPE =  0.0193
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.173
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   B        3.40      0.30     1.000    81
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        7.00      0.25     1.000    88
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.90
  AVERAGE FLOW DEPTH(FEET) =   1.36   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =   20.46
  SUBAREA AREA(ACRES) =    10.60       SUBAREA RUNOFF(CFS) =   18.16
  EFFECTIVE AREA(ACRES) =     25.70     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       25.7         PEAK FLOW RATE(CFS) =      43.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.46   FLOW VELOCITY(FEET/SEC.) =  10.31
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =    3614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   298.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.30  DOWNSTREAM(FEET) =    413.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.520
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.350
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        1.30      0.25     1.000    88    9.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.63
  TOTAL AREA(ACRES) =      1.30   PEAK FLOW RATE(CFS) =      3.63

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.80  DOWNSTREAM(FEET) =    391.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0285
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
```

```
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        5.60      0.25     1.000    88
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.20      0.40     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.61
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   2.90
  Tc(MIN.) =   12.41
  SUBAREA AREA(ACRES) =     5.80       SUBAREA RUNOFF(CFS) =   13.72
  EFFECTIVE AREA(ACRES) =      7.10     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      16.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =   5.23
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =    1098.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    391.00  DOWNSTREAM(FEET) =    377.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   707.00   CHANNEL SLOPE =  0.0198
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.611
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        6.70      0.25     1.000    88
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        0.10      0.40     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.97
  AVERAGE FLOW DEPTH(FEET) =   1.27   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   14.79
  SUBAREA AREA(ACRES) =     6.80       SUBAREA RUNOFF(CFS) =   14.44
  EFFECTIVE AREA(ACRES) =     13.90     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       13.9         PEAK FLOW RATE(CFS) =      29.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   5.24
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    377.00  DOWNSTREAM(FEET) =    365.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   469.00   CHANNEL SLOPE =  0.0256
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.491
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C        6.40      0.25     1.000    88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.06
  AVERAGE FLOW DEPTH(FEET) =   1.41   TRAVEL TIME(MIN.) =   1.29
  Tc(MIN.) =   16.08
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   12.91
  EFFECTIVE AREA(ACRES) =     20.30     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      40.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.48   FLOW VELOCITY(FEET/SEC.) =   6.25
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =    2274.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    365.00  DOWNSTREAM(FEET) =    335.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1896.00   CHANNEL SLOPE =  0.0158
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.256
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   C       16.80      0.25     1.000    88
  AGRICULTURAL POOR COVER
  "ROW CROPS,STRAIGHT ROW"   A        1.80      0.40     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      57.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.28
  AVERAGE FLOW DEPTH(FEET) =   1.67   TRAVEL TIME(MIN.) =   3.07
  Tc(MIN.) =   19.15
  SUBAREA AREA(ACRES) =    18.60       SUBAREA RUNOFF(CFS) =   33.33
  EFFECTIVE AREA(ACRES) =     38.90     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.26  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       38.9         PEAK FLOW RATE(CFS) =      69.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.80   FLOW VELOCITY(FEET/SEC.) =  10.75
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    4170.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       38.9  TC(MIN.) =     19.15
  EFFECTIVE AREA(ACRES) =     38.90  AREA-AVERAGED Fm(INCH/HR)=  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =      69.93
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 4

Proposed 2-Year Storm AES Calculations

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:





 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* WATERSHED 'C' 2 YEAR STORM                                               *
* 12/5/24 JZ                                                               *
 **************************************************************************

  FILE NAME: GVCPR2.DAT
  TIME/DATE OF STUDY: 15:03 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.30  DOWNSTREAM(FEET) =    427.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.287
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.985
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                A        0.30      0.40     0.100    17    6.29
COMMERCIAL                B        0.20      0.30     0.100    36    6.29
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.36
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      0.88
TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      0.88

****************************************************************************
FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  427.80  DOWNSTREAM ELEVATION(FEET) =  421.90
STREET LENGTH(FEET) =   513.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.39
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.24
  HALFSTREET FLOOD WIDTH(FEET) =    4.28
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
STREET FLOW TRAVEL TIME(MIN.) =   4.40   Tc(MIN.) =   10.69
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                A        0.30      0.40     0.100    17
COMMERCIAL                B        0.50      0.30     0.100    36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    1.03
EFFECTIVE AREA(ACRES) =      1.30    AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       1.67

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   5.09
FLOW VELOCITY(FEET/SEC.) =  1.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
LONGEST FLOWPATH FROM NODE    211.00 TO NODE    213.00 =     843.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   413.90  DOWNSTREAM(FEET) =   407.80
FLOW LENGTH(FEET) =   132.00   MANNING'S N =  0.013
```

```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.67
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.99
 LONGEST FLOWPATH FROM NODE    211.00 TO NODE    214.00 =     975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.99
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.441
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.80      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    0.85
 EFFECTIVE AREA(ACRES) =      2.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =        2.1       PEAK FLOW RATE(CFS) =       2.50

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.80  DOWNSTREAM(FEET) =   398.20
 FLOW LENGTH(FEET) =   134.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.64
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.50
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.22
 LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =    1109.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.1  TC(MIN.) =     11.22
 EFFECTIVE AREA(ACRES) =      2.10  AREA-AVERAGED Fm(INCH/HR)=  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap = 0.386
 PEAK FLOW RATE(CFS)   =      2.50
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* WATERSHED 'D' 2 YEAR STORM                                               *
* 12/5/24 JZ                                                               *
 **************************************************************************

  FILE NAME: GVDPR2.DAT
  TIME/DATE OF STUDY: 14:37 12/05/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    449.70  DOWNSTREAM(FEET) =    435.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.798
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.898
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS               A        0.40      0.40      0.350    17    6.80
CONDOMINIUMS               C        0.70      0.25      0.350    50    6.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =      1.77
TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    435.00  DOWNSTREAM(FEET) =    415.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   840.00   CHANNEL SLOPE =  0.0232
  CHANNEL BASE(FEET) =     0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.478
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A        3.40      0.40      0.350    17
  CONDOMINIUMS               C        3.60      0.25      0.350    50
  CONDOMINIUMS               D        0.20      0.20      0.350    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.32
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.77
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   3.71
  Tc(MIN.) =   10.51
  SUBAREA AREA(ACRES) =     7.20       SUBAREA RUNOFF(CFS) =    8.85
  EFFECTIVE AREA(ACRES) =      8.30     AREA-AVERAGED Fm(INCH/HR) =   0.11
  AREA-AVERAGED Fp(INCH/HR) =   0.32  AREA-AVERAGED Ap =   0.35
  TOTAL AREA(ACRES) =        8.3         PEAK FLOW RATE(CFS) =      10.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   4.24
  LONGEST FLOWPATH FROM NODE    311.00 TO NODE    313.00 =    1168.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   406.60
  FLOW LENGTH(FEET) =   172.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.21
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE    311.00 TO NODE    314.00 =    1340.00 FEET.
314 TO NODE 315 MITIGATED Q = 4.81 CFS
****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.00  DOWNSTREAM(FEET) =   400.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       ~~10.21~~ 4.81
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   11.77
  LONGEST FLOWPATH FROM NODE    311.00 TO NODE    316.00 =    1690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.385
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A        1.10      0.40      0.350    17
  CONDOMINIUMS               B        1.20      0.30      0.350    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    2.30       SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =     10.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.32  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       10.6       PEAK FLOW RATE(CFS) =     ~~12.13~~ 6.73

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.50  DOWNSTREAM(FEET) =   395.20
  FLOW LENGTH(FEET) =   126.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       12.13
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE    311.00 TO NODE    317.00 =    1816.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       10.6  TC(MIN.) =     11.94
  EFFECTIVE AREA(ACRES) =     10.60  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.32  AREA-AVERAGED Ap = 0.350
  PEAK FLOW RATE(CFS)    =       ~~12.13~~ 6.73
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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                                 Suite 100
                              Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* SUBAREA 'E' 2 YEAR STORM                                                 *
* 11/25/2024 JZ                                                            *
 **************************************************************************

  FILE NAME: GVEPR2.DAT
  TIME/DATE OF STUDY: 10:36 11/25/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   229.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.128
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.014
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS              A       1.40      0.40     0.350    17    6.13
CONDOMINIUMS              B       0.60      0.30     0.350    36    6.13
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =      3.39
TOTAL AREA(ACRES) =      2.00   PEAK FLOW RATE(CFS) =      3.39

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    404.60  DOWNSTREAM(FEET) =    401.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   241.00   CHANNEL SLOPE =  0.0137
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.788
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS              A       1.20      0.40     0.350    17
  CONDOMINIUMS              B       0.30      0.30     0.350    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.38
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.84
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   1.41
  Tc(MIN.) =    7.54
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =      3.50     AREA-AVERAGED Fm(INCH/HR) =   0.13
  AREA-AVERAGED Fp(INCH/HR) =   0.37  AREA-AVERAGED Ap =   0.35
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       5.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   2.95
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.30  DOWNSTREAM(FEET) =   390.90
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.22
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    7.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.777
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               C        3.90      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =    5.93
  EFFECTIVE AREA(ACRES) =      7.40   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        7.4       PEAK FLOW RATE(CFS) =      11.11

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.90  DOWNSTREAM(FEET) =   389.30
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.11
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     583.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.31
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       7.40
  TOTAL STREAM AREA(ACRES) =       7.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.11

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    459.00  DOWNSTREAM(FEET) =    403.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.258
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.499
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.20      0.25     1.000    59   10.26
```

```
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.35
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
 FLOW PROCESS FROM NODE     14.20 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   396.50  DOWNSTREAM(FEET) =   389.30
 FLOW LENGTH(FEET) =   334.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.35
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   11.31
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     14.00 =     664.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.31
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.417
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       1.40      0.40      0.100    17
 COMMERCIAL                 B       0.10      0.30      0.100    36
 COMMERCIAL                 C       0.30      0.25      0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    2.24
 EFFECTIVE AREA(ACRES) =      3.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =        3.0       PEAK FLOW RATE(CFS) =       3.50

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.31
 RAINFALL INTENSITY(INCH/HR) =   1.42
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.27
 AREA-AVERAGED Ap =  0.46
 EFFECTIVE STREAM AREA(ACRES) =       3.00
 TOTAL STREAM AREA(ACRES) =       3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.50

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
    1       11.11    7.72    1.764  0.31( 0.11) 0.35       7.4      10.00
    2        3.50   11.31    1.417  0.27( 0.12) 0.46       3.0      14.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       14.14    7.72    1.764  0.30( 0.11) 0.37       9.4      10.00
    2       12.28   11.31    1.417  0.29( 0.11) 0.38      10.4      14.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.14    Tc(MIN.) =     7.72
  EFFECTIVE AREA(ACRES) =       9.45   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      10.4
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     14.00 =     664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   389.30  DOWNSTREAM(FEET) =   377.10
  FLOW LENGTH(FEET) =   494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.14
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.52
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     15.00 =    1158.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.52
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.667
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A       2.50      0.40     0.350    17
  CONDOMINIUMS               B       0.80      0.30     0.350    36
  CONDOMINIUMS               C       0.40      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.36
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    5.13
  EFFECTIVE AREA(ACRES) =     13.15   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      14.1       PEAK FLOW RATE(CFS) =      18.36

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.52
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.667
```

```
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               C       3.60      0.25     0.350    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    5.12
 EFFECTIVE AREA(ACRES) =     16.75   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       17.7       PEAK FLOW RATE(CFS) =      23.48

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   377.10  DOWNSTREAM(FEET) =   367.20
 FLOW LENGTH(FEET) =   356.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.13
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.48
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.01
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     16.00 =    1514.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.01
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.615
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               C       2.70      0.25     0.350    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    3.71
 EFFECTIVE AREA(ACRES) =     19.45   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       20.4       PEAK FLOW RATE(CFS) =      26.40

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.20  DOWNSTREAM(FEET) =   365.20
 FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.53
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.40
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.08
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     17.00 =    1572.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       0.30      0.40     0.100    17
  COMMERCIAL                 B       0.10      0.30     0.100    36
  COMMERCIAL                 C       1.40      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =     21.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       22.2       PEAK FLOW RATE(CFS) =      28.83

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   365.20  DOWNSTREAM(FEET) =   363.40
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.83
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.22
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     18.00 =    1663.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.22
  RAINFALL INTENSITY(INCH/HR) =   1.59
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =      21.25
  TOTAL STREAM AREA(ACRES) =      22.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.83

****************************************************************************
  FLOW PROCESS FROM NODE     18.10 TO NODE     18.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    391.00  DOWNSTREAM(FEET) =    378.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
```

```
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS               A        0.40      0.40     0.350    17    7.06
 CONDOMINIUMS               B        1.00      0.30     0.350    36    7.06
 CONDOMINIUMS               C        1.00      0.25     0.350    50    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      3.79
 TOTAL AREA(ACRES) =      2.40   PEAK FLOW RATE(CFS) =      3.79

****************************************************************************
 FLOW PROCESS FROM NODE     18.20 TO NODE     18.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    378.60  DOWNSTREAM(FEET) =    374.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =   369.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.574
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.80      0.30     0.350    36
 CONDOMINIUMS               C        1.10      0.25     0.350    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.61
 AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   2.36
 Tc(MIN.) =    9.42
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    2.53
 EFFECTIVE AREA(ACRES) =      4.30     AREA-AVERAGED Fm(INCH/HR) =   0.10
 AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.35
 TOTAL AREA(ACRES) =        4.3         PEAK FLOW RATE(CFS) =       5.70

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   2.68
 LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.30 =     699.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.30 TO NODE     18.40 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.90  DOWNSTREAM(FEET) =   365.70
 FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.70
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.52
 LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.40 =     758.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.40 TO NODE     18.40 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    9.52
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B       0.80      0.30     0.100    36
  COMMERCIAL                 C       0.40      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =       5.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =       7.33

****************************************************************************
  FLOW PROCESS FROM NODE     18.40 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   365.70  DOWNSTREAM(FEET) =   363.40
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.33
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.00 =     801.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   1.56
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.30
  EFFECTIVE STREAM AREA(ACRES) =       5.50
  TOTAL STREAM AREA(ACRES) =       5.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.83    9.22    1.594  0.29( 0.10) 0.34      21.2      10.00
      1       24.46   12.85    1.317  0.29( 0.10) 0.34      22.2      14.10
      2        7.33    9.58    1.559  0.28( 0.08) 0.30       5.5      18.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       36.04    9.22    1.594  0.29( 0.10) 0.33      26.5      10.00
    2       35.71    9.58    1.559  0.29( 0.10) 0.33      26.8      18.10
    3       30.59   12.85    1.317  0.29( 0.10) 0.33      27.7      14.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      36.04    Tc(MIN.) =     9.22
EFFECTIVE AREA(ACRES) =      26.54   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =       27.7
LONGEST FLOWPATH FROM NODE     14.10 TO NODE     18.00 =    1663.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   363.40  DOWNSTREAM(FEET) =   360.90
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.04
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     19.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   1.58
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.33
  EFFECTIVE STREAM AREA(ACRES) =      26.54
  TOTAL STREAM AREA(ACRES) =      27.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.04

****************************************************************************
  FLOW PROCESS FROM NODE     19.10 TO NODE     19.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    467.50  DOWNSTREAM(FEET) =    458.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.355
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.973
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C       0.30      0.25     0.100    50    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE     19.20 TO NODE     19.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.50  DOWNSTREAM ELEVATION(FEET) =  397.30
  STREET LENGTH(FEET) =  1205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   5.21   Tc(MIN.) =   11.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.90      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =      1.20    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.78
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.30 =    1535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.40 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    397.30
  DOWNSTREAM NODE ELEVATION(FEET) =    373.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   152.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.500
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.387
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"              C        2.40      0.25     1.000    59
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.59
 AVERAGE FLOW DEPTH(FEET) =   0.50   FLOOD WIDTH(FEET) =    2.00
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   11.74
 SUBAREA AREA(ACRES) =    2.40       SUBAREA RUNOFF(CFS) =    2.46
 EFFECTIVE AREA(ACRES) =    3.60     AREA-AVERAGED Fm(INCH/HR) =   0.17
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.70
 TOTAL AREA(ACRES) =        3.6         PEAK FLOW RATE(CFS) =       3.93

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
        IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.50   FLOOD WIDTH(FEET) =    2.00
 FLOW VELOCITY(FEET/SEC.) =  14.59   DEPTH*VELOCITY(FT*FT/SEC) =   7.30
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.40 =    1687.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.40 TO NODE     19.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   366.00  DOWNSTREAM(FEET) =   364.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        3.93
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.31
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.50 =    1872.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.50 TO NODE     19.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.31
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.349
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS              C        1.00      0.25     0.350    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.14
 EFFECTIVE AREA(ACRES) =      4.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =       4.94

****************************************************************************
 FLOW PROCESS FROM NODE     19.50 TO NODE     19.60 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   364.20  DOWNSTREAM(FEET) =   362.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.94
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.60 =    2097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.60 TO NODE     19.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.310
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                C       1.40      0.25     0.850    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    1.38
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE     19.60 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   362.00  DOWNSTREAM(FEET) =   360.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   13.07
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.00 =    2147.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.07
  RAINFALL INTENSITY(INCH/HR) =   1.30
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =       6.00
  TOTAL STREAM AREA(ACRES) =       6.00
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.04    9.39    1.576  0.29( 0.10) 0.33      26.5      10.00
      1       35.71    9.76    1.542  0.29( 0.10) 0.33      26.8      18.10
      1       30.59   13.04    1.306  0.29( 0.10) 0.33      27.7      14.10
      2        6.16   13.07    1.304  0.25( 0.17) 0.68       6.0      19.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.53    9.39    1.576  0.28( 0.11) 0.38      30.8      10.00
      2       41.28    9.76    1.542  0.28( 0.11) 0.38      31.3      18.10
      3       36.74   13.04    1.306  0.28( 0.11) 0.40      33.7      14.10
      4       36.69   13.07    1.304  0.28( 0.11) 0.40      33.7      19.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.53    Tc(MIN.) =     9.39
  EFFECTIVE AREA(ACRES) =      30.85   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       33.7
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.00 =    2147.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.90  DOWNSTREAM(FEET) =   350.40
  FLOW LENGTH(FEET) =   364.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.36
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.53
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     20.00 =    2511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.537
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        3.00      0.30     0.350    36
  CONDOMINIUMS               C        1.20      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    5.43
  EFFECTIVE AREA(ACRES) =     35.05   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       37.9       PEAK FLOW RATE(CFS) =      45.14
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.537
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS              C       4.60      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    4.60      SUBAREA RUNOFF(CFS) =    6.00
  EFFECTIVE AREA(ACRES) =     39.65   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      51.14

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.40  DOWNSTREAM(FEET) =   346.90
  FLOW LENGTH(FEET) =   152.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.85
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.14
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     21.00 =    2663.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.521
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C       1.10      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    1.48
  EFFECTIVE AREA(ACRES) =     40.75   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       43.6       PEAK FLOW RATE(CFS) =      52.04

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   346.90  DOWNSTREAM(FEET) =   342.10
  FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.04
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     22.00 =    2730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.05
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.516
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B       4.60      0.30     0.350    36
  CONDOMINIUMS               C       0.80      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    6.87
  EFFECTIVE AREA(ACRES) =     46.15   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       49.0       PEAK FLOW RATE(CFS) =      58.75

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.10  DOWNSTREAM(FEET) =   339.90
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.75
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     23.00 =    3164.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.94
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.444
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C       0.90      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    1.15
  EFFECTIVE AREA(ACRES) =     47.05   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       49.9       PEAK FLOW RATE(CFS) =      58.75
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.90  DOWNSTREAM(FEET) =   339.50
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.75
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.04
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     24.00 =    3220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.04
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.437
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               C        4.50      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    5.46
  EFFECTIVE AREA(ACRES) =     51.55   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       54.4       PEAK FLOW RATE(CFS) =      62.05

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.50  DOWNSTREAM(FEET) =   333.30
  FLOW LENGTH(FEET) =   505.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.05
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     25.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.385
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A        1.40      0.40     0.350    17
  CONDOMINIUMS               C        8.80      0.25     0.350    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   11.84
```

```
 EFFECTIVE AREA(ACRES) =     61.75   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       64.6       PEAK FLOW RATE(CFS) =      71.47

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   333.30  DOWNSTREAM(FEET) =   331.50
 FLOW LENGTH(FEET) =   177.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.04
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      71.47
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   12.04
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     26.00 =    3902.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       64.6  TC(MIN.) =     12.04
 EFFECTIVE AREA(ACRES) =     61.75  AREA-AVERAGED Fm(INCH/HR)=  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.356
 PEAK FLOW RATE(CFS)   =      71.47

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       71.47   12.04    1.367  0.28( 0.10) 0.36      61.7      10.00
     2       70.64   12.41    1.343  0.28( 0.10) 0.36      62.2      18.10
     3       62.80   15.81    1.169  0.27( 0.10) 0.37      64.6      14.10
     4       62.73   15.85    1.168  0.27( 0.10) 0.37      64.6      19.10
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                           15535 Sand Canyon Ave
                                 Suite 100
                              Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* SUBAREA 'F' 2 YEAR STORM                                                 *
* 11/25/2024 JZ                                                            *
 **************************************************************************

  FILE NAME: GVFPR2.DAT
  TIME/DATE OF STUDY: 09:51 11/25/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.60  DOWNSTREAM(FEET) =    347.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.914
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.739
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS               B        0.40      0.30     0.350    36    7.91
CONDOMINIUMS               C        3.00      0.25     0.350    50    7.91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =      5.05
TOTAL AREA(ACRES) =      3.40   PEAK FLOW RATE(CFS) =      5.05

****************************************************************************
FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    347.60  DOWNSTREAM(FEET) =    343.70
CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00   CHANNEL SLOPE =  0.0100
CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.500
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS               B        0.10      0.30     0.350    36
CONDOMINIUMS               C        2.40      0.25     0.350    50
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.79
AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   2.33
Tc(MIN.) =   10.25
SUBAREA AREA(ACRES) =     2.50       SUBAREA RUNOFF(CFS) =    3.18
EFFECTIVE AREA(ACRES) =      5.90     AREA-AVERAGED Fm(INCH/HR) =   0.09
AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.35
TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =       7.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   2.86
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     721.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   337.70  DOWNSTREAM(FEET) =   337.20
FLOW LENGTH(FEET) =   131.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.39
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.49
PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   10.74
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     852.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.74
```

```
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.459
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                A        0.50      0.40     0.100    17
 COMMERCIAL                C        0.30      0.25     0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    1.03
 EFFECTIVE AREA(ACRES) =      6.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =       8.30

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   337.20  DOWNSTREAM(FEET) =   336.25
 FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.30
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   11.08
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     970.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     11.08
 EFFECTIVE AREA(ACRES) =      6.70  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.320
 PEAK FLOW RATE(CFS)   =      8.30
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 5

Proposed 25-Year Storm AES Calculations

```
****************************************************************************
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                            Analysis prepared by:

                           Fuscoe Engineering, Inc.
                              600 Wilshire Blvd
                                  Suite 1470
                            Los Angeles, CA 90017

 ************************** DESCRIPTION OF STUDY **************************
 * GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
 * SUBAREA 'C' 25 YEAR STORM                                                *
 * 12/4/2024 CK                                                             *
 **************************************************************************

  FILE NAME: GVCPR25.DAT
  TIME/DATE OF STUDY: 15:46 12/04/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    745.00  DOWNSTREAM(FEET) =    680.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.386
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.377
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.80      0.25     1.000    77    9.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    680.00  DOWNSTREAM(FEET) =    608.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   984.00   CHANNEL SLOPE =  0.0732
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.991
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.70      0.25     0.100    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        5.00      0.25     1.000    77
  COMMERCIAL                 D        0.90      0.20     0.100    75
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.60      0.20     1.000    83
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.697
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.31
  AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   2.24
  Tc(MIN.) =   11.63
  SUBAREA AREA(ACRES) =    10.70       SUBAREA RUNOFF(CFS) =   27.09
  EFFECTIVE AREA(ACRES) =     11.50     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.72
  TOTAL AREA(ACRES) =       11.5         PEAK FLOW RATE(CFS) =      29.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   8.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    1284.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    608.00  DOWNSTREAM(FEET) =    510.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1446.80   CHANNEL SLOPE =  0.0677
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.662
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              A        1.60      0.40     1.000    46
  NATURAL FAIR COVER
  "OPEN BRUSH"              B        4.20      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"              C        5.70      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.07
  AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   2.66
  Tc(MIN.) =   14.29
  SUBAREA AREA(ACRES) =    11.50       SUBAREA RUNOFF(CFS) =   24.56
  EFFECTIVE AREA(ACRES) =     23.00     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =       23.0         PEAK FLOW RATE(CFS) =      50.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.33   FLOW VELOCITY(FEET/SEC.) =   9.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    2730.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  16
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
============================================================================
  USER-SPECIFIED CONSTANT SOURCE FLOW =    77.00(CFS)
  USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW =    23.01(ACRES)
  * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =    77.00  AREA(AC.) =    23.01
  * SUMMED DATA: FLOW(CFS) =   127.22    TOTAL AREA(ACRES) =    46.01

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    510.00  DOWNSTREAM(FEET) =    445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1835.40   CHANNEL SLOPE =  0.0354
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   4.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.401
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              A        8.20      0.40     1.000    46
  COMMERCIAL                B        4.80      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"              B       17.80      0.30     1.000    66
```

```
 COMMERCIAL                 C        1.20      0.25     0.100    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               C       38.00      0.25     1.000    77
 NATURAL FAIR COVER
 "OPEN BRUSH"               D       20.30      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.940
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     214.84
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.68
 AVERAGE FLOW DEPTH(FEET) =   2.59   TRAVEL TIME(MIN.) =   2.86
 Tc(MIN.) =   17.15
 SUBAREA AREA(ACRES) =    90.30       SUBAREA RUNOFF(CFS) =  174.99
 EFFECTIVE AREA(ACRES) =    113.30     AREA-AVERAGED Fm(INCH/HR) =   0.25
 AREA-AVERAGED Fp(INCH/HR) =   0.27  AREA-AVERAGED Ap =   0.92
 TOTAL AREA(ACRES) =      113.3         PEAK FLOW RATE(CFS) =     219.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.92   FLOW VELOCITY(FEET/SEC.) =  11.61
 * TOTAL SOURCE FLOW(CFS) =      77.00
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    4566.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    211.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    429.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   709.00   CHANNEL SLOPE =  0.0219
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   4.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.310
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               A        0.50      0.40     1.000    46
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        5.80      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               C        6.80      0.25     1.000    77
 NATURAL FAIR COVER
 "OPEN BRUSH"               D        4.10      0.20     1.000    83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     312.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.79
 AVERAGE FLOW DEPTH(FEET) =   3.26   TRAVEL TIME(MIN.) =   1.21
 Tc(MIN.) =   18.36
 SUBAREA AREA(ACRES) =    17.20       SUBAREA RUNOFF(CFS) =   31.75
 EFFECTIVE AREA(ACRES) =    130.50     AREA-AVERAGED Fm(INCH/HR) =   0.25
 AREA-AVERAGED Fp(INCH/HR) =   0.26  AREA-AVERAGED Ap =   0.93
 TOTAL AREA(ACRES) =      130.5         PEAK FLOW RATE(CFS) =     242.30

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.29   FLOW VELOCITY(FEET/SEC.) =   9.86
 * TOTAL SOURCE FLOW(CFS) =      77.00
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    211.00 =    5275.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   429.50  DOWNSTREAM(FEET) =   413.70
  FLOW LENGTH(FEET) =   617.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.63
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     319.30
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   18.82
  * TOTAL SOURCE FLOW(CFS) =      77.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    212.00 =    5892.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.70  DOWNSTREAM(FEET) =   410.70
  FLOW LENGTH(FEET) =   148.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  43.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.78
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     319.30
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   18.93
  * TOTAL SOURCE FLOW(CFS) =      77.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    213.00 =    6040.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    1.63
  EFFECTIVE AREA(ACRES) =    131.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =      131.4       PEAK FLOW RATE(CFS) =     242.30
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  * SOURCE FLOW DATA: FLOW(CFS) =      77.00     AREA(ACRES) =       23.0
  * SUMMED DATA: FLOW(CFS) =     319.30    TOTAL AREA(ACRES) =      154.4

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 A        0.60      0.40     0.200    32
  APARTMENTS                 B        0.80      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    2.77
  EFFECTIVE AREA(ACRES) =    132.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =      132.8       PEAK FLOW RATE(CFS) =     242.30
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  * SOURCE FLOW DATA: FLOW(CFS) =      77.00     AREA(ACRES) =       23.0
  * SUMMED DATA: FLOW(CFS) =     319.30    TOTAL AREA(ACRES) =      155.8

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.70  DOWNSTREAM(FEET) =   398.20
  FLOW LENGTH(FEET) =    79.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  43.99
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     319.30
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   18.96
  * TOTAL SOURCE FLOW(CFS) =      77.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    214.00 =    6119.20 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      132.8  TC(MIN.) =     18.96
  EFFECTIVE AREA(ACRES) =    132.80  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap = 0.925
  PEAK FLOW RATE(CFS)   =     242.30
  * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =      77.00  AREA(AC.) =
23.0
  * SUMMED DATA: FLOW(CFS) =     319.30    TOTAL AREA(ACRES) =      155.8
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                            Analysis prepared by:

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                            Los Angeles, CA 90017

 ************************** DESCRIPTION OF STUDY **************************
 * GATEWAY VILLAGE PROPOSED CONDITION                                       *
 * SUBAREA 'D' 25 YEAR STORM                                                *
 * 11/27/2024 CK                                                            *
 **************************************************************************

  FILE NAME: GVDPR25.DAT
  TIME/DATE OF STUDY: 14:07 11/27/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    620.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.882
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN   (MIN.)
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"              C        0.20      0.25     1.000    77   11.88
  NATURAL FAIR COVER
  "OPEN BRUSH"              D        0.20      0.20     1.000    83   11.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2812.10   CHANNEL SLOPE =  0.0676
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              C       17.20      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   6.47
  Tc(MIN.) =   18.35
  SUBAREA AREA(ACRES) =    17.20       SUBAREA RUNOFF(CFS) =   31.91
  EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       17.6        PEAK FLOW RATE(CFS) =      32.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   8.49
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    3112.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.88
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.66
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   18.47
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    3227.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"               C       17.20      0.25     1.000    77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   17.20      SUBAREA RUNOFF(CFS) =   31.77
EFFECTIVE AREA(ACRES) =     34.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =       34.8       PEAK FLOW RATE(CFS) =      64.29

****************************************************************************
FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   422.30
FLOW LENGTH(FEET) =   281.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.60
ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      64.29
PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   18.91
LONGEST FLOWPATH FROM NODE    300.00 TO NODE    308.00 =    3508.10 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    308.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   422.30  DOWNSTREAM(FEET) =   414.70
FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  24.19
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      64.29
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   18.97
LONGEST FLOWPATH FROM NODE    300.00 TO NODE    311.00 =    3591.10 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   18.97
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"               C        2.20      0.25     1.000    77
NATURAL FAIR COVER
"OPEN BRUSH"               D        1.10      0.20     1.000    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.04
EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      69.26

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    311.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   414.70  DOWNSTREAM(FEET) =   407.40
 FLOW LENGTH(FEET) =   387.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.58
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      69.26
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   19.44
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =    3978.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.44
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.237
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               A        3.80      0.40     0.350    32
 CONDOMINIUMS               C        4.30      0.25     0.350    69
 CONDOMINIUMS               D        0.20      0.20     0.350    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.32
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   15.88
 EFFECTIVE AREA(ACRES) =     46.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.88
 TOTAL AREA(ACRES) =       46.4       PEAK FLOW RATE(CFS) =      84.05

****************************************************************************
 FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   401.80
 FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.49
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      84.05
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   19.71
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    314.00 =    4228.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.71
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               A        1.10      0.40     0.350    32
 CONDOMINIUMS               B        1.30      0.30     0.350    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
```

```
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    4.53
  EFFECTIVE AREA(ACRES) =     48.80   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       48.8       PEAK FLOW RATE(CFS) =      87.86

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.80  DOWNSTREAM(FEET) =   395.20
  FLOW LENGTH(FEET) =   126.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.86
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   19.81
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    4354.10 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.8  TC(MIN.) =     19.81
  EFFECTIVE AREA(ACRES) =     48.80  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.857
  PEAK FLOW RATE(CFS)   =      87.86
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                             600 Wilshire Blvd
                                 Suite 1470
                           Los Angeles, CA 90017

 ************************** DESCRIPTION OF STUDY **************************
 * GATEWAY VILLAGE PROPOSED CONDITION-MITIGATED                             *
 * SUBAREA 'D' 25 YEAR STORM                                                *
 * 12/4/2024 CK                                                             *
 **************************************************************************

  FILE NAME: GVDPR25M.DAT
  TIME/DATE OF STUDY: 16:17 12/04/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    620.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.882
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        0.20      0.25     1.000    77   11.88
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        0.20      0.20     1.000    83   11.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2812.10   CHANNEL SLOPE =  0.0676
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C       17.20      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   6.47
  Tc(MIN.) =   18.35
  SUBAREA AREA(ACRES) =    17.20       SUBAREA RUNOFF(CFS) =   31.91
  EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      32.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   8.49
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    3112.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    306.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.88
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      32.66
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   18.47
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    3227.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.47
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                C       17.20      0.25     1.000    77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   17.20      SUBAREA RUNOFF(CFS) =   31.77
 EFFECTIVE AREA(ACRES) =     34.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       34.8       PEAK FLOW RATE(CFS) =      64.29

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    308.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   422.30
 FLOW LENGTH(FEET) =   281.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.60
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.29
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   18.91
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    308.00 =    3508.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    308.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   422.30  DOWNSTREAM(FEET) =   414.70
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.19
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.29
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   18.97
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    311.00 =    3591.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   18.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        2.20      0.25     1.000    77
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        1.10      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.04
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      69.26

******************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    313.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   414.70  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   387.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.58
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.26
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   19.44
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =    3978.10 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  16
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED CONSTANT SOURCE FLOW AT NODE<<<<<
==============================================================================
  USER-SPECIFIED CONSTANT SOURCE FLOW =     7.90(CFS)
  USER-SPECIFIED AREA ASSOCIATED TO SOURCE FLOW =     8.30(ACRES)
  * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =     7.90  AREA(AC.) =     8.30
  * SUMMED DATA: FLOW(CFS) =    77.16    TOTAL AREA(ACRES) =    46.40

******************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   401.80
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.16
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   19.72
  * TOTAL SOURCE FLOW(CFS) =       7.90
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    314.00 =    4228.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A       1.10      0.40     0.350    32
  CONDOMINIUMS               B       1.30      0.30     0.350    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    4.53
  EFFECTIVE AREA(ACRES) =     40.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.96
  TOTAL AREA(ACRES) =       40.5       PEAK FLOW RATE(CFS) =      72.10

  * SOURCE FLOW DATA: FLOW(CFS) =       7.90     AREA(ACRES) =        8.3
  * SUMMED DATA: FLOW(CFS) =      80.00    TOTAL AREA(ACRES) =       48.8

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.80  DOWNSTREAM(FEET) =   395.20
  FLOW LENGTH(FEET) =   126.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.00
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   19.82
  * TOTAL SOURCE FLOW(CFS) =       7.90
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    4354.10 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       40.5  TC(MIN.) =     19.82
  EFFECTIVE AREA(ACRES) =     40.50  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.961
  PEAK FLOW RATE(CFS)    =      72.10
  * CUMULATIVE SOURCE FLOW DATA: FLOW(CFS) =       7.90  AREA(AC.) =
8.3
  * SUMMED DATA: FLOW(CFS) =      80.00    TOTAL AREA(ACRES) =       48.8
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                           15535 Sand Canyon Ave
                                 Suite 100
                              Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* SUBAREA 'E' 25 YEAR STORM                                                *
* 11/25/2024 JZ                                                            *
 **************************************************************************

  FILE NAME: GVEPR25.DAT
  TIME/DATE OF STUDY: 10:22 11/25/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                   --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   229.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.128
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.299
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS               A       1.40      0.40     0.350    32    6.13
CONDOMINIUMS               B       0.60      0.30     0.350    56    6.13
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =      7.50
TOTAL AREA(ACRES) =      2.00   PEAK FLOW RATE(CFS) =      7.50

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    404.60  DOWNSTREAM(FEET) =    401.30
CHANNEL LENGTH THRU SUBAREA(FEET) =   241.00   CHANNEL SLOPE =  0.0137
CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.899
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS               A       1.20      0.40     0.350    32
CONDOMINIUMS               B       0.30      0.30     0.350    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.38
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.05
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.48
AVERAGE FLOW DEPTH(FEET) =   0.98   TRAVEL TIME(MIN.) =   1.15
Tc(MIN.) =    7.28
SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    5.08
EFFECTIVE AREA(ACRES) =      3.50     AREA-AVERAGED Fm(INCH/HR) =   0.13
AREA-AVERAGED Fp(INCH/HR) =   0.37  AREA-AVERAGED Ap =   0.35
TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =      11.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =   3.64
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     470.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   394.30  DOWNSTREAM(FEET) =   390.90
FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      11.87
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.35
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     525.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    7.35
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.879
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               C        3.90      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   13.31
  EFFECTIVE AREA(ACRES) =      7.40   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        7.4       PEAK FLOW RATE(CFS) =      25.12

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.90  DOWNSTREAM(FEET) =   389.30
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.15
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.12
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     583.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.43
  RAINFALL INTENSITY(INCH/HR) =   3.86
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.31
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       7.40
  TOTAL STREAM AREA(ACRES) =       7.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.12

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    459.00  DOWNSTREAM(FEET) =    403.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.258
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.20      0.25     1.000    77   10.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.20
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.20

****************************************************************************
  FLOW PROCESS FROM NODE     14.20 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   396.50  DOWNSTREAM(FEET) =   389.30
  FLOW LENGTH(FEET) =   334.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.20
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     14.00 =     664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.075
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       1.40      0.40     0.100    32
  COMMERCIAL                 B       0.10      0.30     0.100    56
  COMMERCIAL                 C       0.30      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    4.92
  EFFECTIVE AREA(ACRES) =      3.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        3.0       PEAK FLOW RATE(CFS) =       7.97

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.27
  AREA-AVERAGED Ap =  0.46
  EFFECTIVE STREAM AREA(ACRES) =       3.00
  TOTAL STREAM AREA(ACRES) =       3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.97

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
    1       25.12    7.43    3.856  0.31( 0.11) 0.35       7.4      10.00
    2        7.97   11.08    3.075  0.27( 0.12) 0.46       3.0      14.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       31.87    7.43    3.856  0.30( 0.11) 0.37       9.4      10.00
    2       27.85   11.08    3.075  0.29( 0.11) 0.38      10.4      14.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.87    Tc(MIN.) =     7.43
  EFFECTIVE AREA(ACRES) =       9.41   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      10.4
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     14.00 =     664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   389.30  DOWNSTREAM(FEET) =   377.10
  FLOW LENGTH(FEET) =   494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.87
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.09
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     15.00 =    1158.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.675
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A       2.50      0.40     0.350    32
  CONDOMINIUMS               B       0.80      0.30     0.350    56
  CONDOMINIUMS               C       0.40      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.36
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =   11.82
  EFFECTIVE AREA(ACRES) =     13.11   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.31  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      14.1       PEAK FLOW RATE(CFS) =      42.00

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.675
```

```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               C       3.60      0.25      0.350    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =   11.62
 EFFECTIVE AREA(ACRES) =     16.71   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       17.7       PEAK FLOW RATE(CFS) =      53.62

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   377.10  DOWNSTREAM(FEET) =   367.20
 FLOW LENGTH(FEET) =   356.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.10
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      53.62
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    8.48
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     16.00 =    1514.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.48
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.577
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               C       2.70      0.25      0.350    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    8.48
 EFFECTIVE AREA(ACRES) =     19.41   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       20.4       PEAK FLOW RATE(CFS) =      60.64

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   367.20  DOWNSTREAM(FEET) =   365.20
 FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.86
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      60.64
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.54
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     17.00 =    1572.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       0.30      0.40     0.100    32
  COMMERCIAL                 B       0.10      0.30     0.100    56
  COMMERCIAL                 C       1.40      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.73
  EFFECTIVE AREA(ACRES) =     21.21   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       22.2       PEAK FLOW RATE(CFS) =      66.13

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   365.20  DOWNSTREAM(FEET) =   363.40
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.13
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE     14.10 TO NODE     18.00 =    1663.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.65
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =      21.21
  TOTAL STREAM AREA(ACRES) =      22.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.13

****************************************************************************
  FLOW PROCESS FROM NODE     18.10 TO NODE     18.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    391.00  DOWNSTREAM(FEET) =    378.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.968
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               A        0.40      0.40     0.350    32    7.06
  CONDOMINIUMS               B        1.00      0.30     0.350    56    7.06
  CONDOMINIUMS               C        1.00      0.25     0.350    69    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      8.35
  TOTAL AREA(ACRES) =      2.40   PEAK FLOW RATE(CFS) =      8.35

****************************************************************************
  FLOW PROCESS FROM NODE     18.20 TO NODE     18.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    378.60  DOWNSTREAM(FEET) =    374.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   369.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.459
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        0.80      0.30     0.350    56
  CONDOMINIUMS               C        1.10      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.17
  AVERAGE FLOW DEPTH(FEET) =   1.09   TRAVEL TIME(MIN.) =   1.94
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    5.75
  EFFECTIVE AREA(ACRES) =      4.30     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.35
  TOTAL AREA(ACRES) =        4.3         PEAK FLOW RATE(CFS) =      13.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   3.29
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.30 =     699.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.30 TO NODE     18.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.90  DOWNSTREAM(FEET) =   365.70
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.00
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.40 =     758.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.40 TO NODE     18.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.441
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.80      0.30     0.100     56
  COMMERCIAL                C        0.40      0.25     0.100     69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.28
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.69
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =      16.62

****************************************************************************
  FLOW PROCESS FROM NODE     18.40 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   365.70  DOWNSTREAM(FEET) =   363.40
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.62
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE     18.10 TO NODE     18.00 =     801.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.13
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.28
  AREA-AVERAGED Ap =  0.30
  EFFECTIVE STREAM AREA(ACRES) =       5.50
  TOTAL STREAM AREA(ACRES) =       5.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       66.13    8.65    3.538  0.29( 0.10) 0.34      21.2      10.00
      1       56.09   12.34    2.892  0.29( 0.10) 0.34      22.2      14.10
      2       16.62    9.13    3.431  0.28( 0.08) 0.30       5.5      18.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.37    8.65    3.538  0.29( 0.10) 0.33      26.4      10.00
```

```
    2       81.43    9.13    3.431  0.29( 0.10) 0.33      26.8      18.10
    3       70.03   12.34    2.892  0.29( 0.10) 0.33      27.7      14.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      82.37    Tc(MIN.) =     8.65
 EFFECTIVE AREA(ACRES) =      26.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.33
 TOTAL AREA(ACRES) =      27.7
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     18.00 =    1663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   363.40  DOWNSTREAM(FEET) =   360.90
 FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.61
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      82.37
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.79
 LONGEST FLOWPATH FROM NODE     14.10 TO NODE     19.00 =    1790.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.79
 RAINFALL INTENSITY(INCH/HR) =   3.51
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.33
 EFFECTIVE STREAM AREA(ACRES) =      26.42
 TOTAL STREAM AREA(ACRES) =      27.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.37

****************************************************************************
 FLOW PROCESS FROM NODE     19.10 TO NODE     19.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    467.50  DOWNSTREAM(FEET) =    458.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.355
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.211
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        0.30      0.25     0.100    69    6.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.13
 TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.13
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     19.20 TO NODE     19.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.50  DOWNSTREAM ELEVATION(FEET) =  397.30
  STREET LENGTH(FEET) =  1205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   4.72   Tc(MIN.) =   11.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.90      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.47
  EFFECTIVE AREA(ACRES) =      1.20    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =    7.59
  FLOW VELOCITY(FEET/SEC.) =  4.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.30 =    1535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.30 TO NODE     19.40 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    397.30
  DOWNSTREAM NODE ELEVATION(FEET) =    373.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   152.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.500
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.049
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```

```
  "OPEN BRUSH"               C        2.40      0.25     1.000    77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.59
  AVERAGE FLOW DEPTH(FEET) =   0.50   FLOOD WIDTH(FEET) =    2.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   11.24
  SUBAREA AREA(ACRES) =    2.40       SUBAREA RUNOFF(CFS) =    6.05
  EFFECTIVE AREA(ACRES) =    3.60     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =        3.6         PEAK FLOW RATE(CFS) =       9.31

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOOD WIDTH(FEET) =    4.84
  FLOW VELOCITY(FEET/SEC.) =  15.09   DEPTH*VELOCITY(FT*FT/SEC) =   8.13
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.40 =    1687.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.40 TO NODE     19.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   366.00  DOWNSTREAM(FEET) =   364.20
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.31
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.50 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.50 TO NODE     19.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               C        1.00      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.60
  EFFECTIVE AREA(ACRES) =      4.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      11.68

****************************************************************************
  FLOW PROCESS FROM NODE     19.50 TO NODE     19.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   364.20  DOWNSTREAM(FEET) =   362.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      11.68
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.26
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.60 =    2097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.60 TO NODE     19.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.904
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               C       1.40      0.25     0.850    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    3.39
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =      14.77

****************************************************************************
  FLOW PROCESS FROM NODE     19.60 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   362.00  DOWNSTREAM(FEET) =   360.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.77
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.34
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.00 =    2147.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.34
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =       6.00
  TOTAL STREAM AREA(ACRES) =       6.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       82.37    8.79    3.505  0.29( 0.10) 0.33      26.4      10.00
      1       81.43    9.27    3.400  0.29( 0.10) 0.33      26.8      18.10
      1       70.03   12.49    2.872  0.29( 0.10) 0.33      27.7      14.10
      2       14.77   12.34    2.893  0.25( 0.17) 0.68       6.0      19.10
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       95.26    8.79    3.505  0.28( 0.11) 0.38      30.7      10.00
      2       94.60    9.27    3.400  0.28( 0.11) 0.38      31.3      18.10
      3       85.34   12.34    2.893  0.28( 0.11) 0.40      33.7      19.10
      4       84.69   12.49    2.872  0.28( 0.11) 0.40      33.7      14.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      95.26    Tc(MIN.) =     8.79
  EFFECTIVE AREA(ACRES) =      30.69   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       33.7
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     19.00 =    2147.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.90  DOWNSTREAM(FEET) =   350.40
  FLOW LENGTH(FEET) =   364.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.57
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.26
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.14
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     20.00 =    2511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.14
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.430
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B       3.00      0.30     0.350    56
  CONDOMINIUMS               C       1.20      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =   12.59
  EFFECTIVE AREA(ACRES) =     34.89   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       37.9       PEAK FLOW RATE(CFS) =     104.37

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.14
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.430
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS              C       4.60      0.25     0.350    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    4.60      SUBAREA RUNOFF(CFS) =   13.84
 EFFECTIVE AREA(ACRES) =     39.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =     118.21

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.40  DOWNSTREAM(FEET) =   346.90
 FLOW LENGTH(FEET) =   152.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.77
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     118.21
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.29
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     21.00 =    2663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.29
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.398
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                C       1.10      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.34
 EFFECTIVE AREA(ACRES) =     40.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       43.6       PEAK FLOW RATE(CFS) =     120.42

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   346.90  DOWNSTREAM(FEET) =   342.10
 FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.18
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     120.42
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.33
 LONGEST FLOWPATH FROM NODE     19.10 TO NODE     22.00 =    2730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               B        4.60      0.30     0.350    56
  CONDOMINIUMS               C        0.80      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.29
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   15.97
  EFFECTIVE AREA(ACRES) =     45.99   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       49.0       PEAK FLOW RATE(CFS) =     136.07

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.10  DOWNSTREAM(FEET) =   339.90
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  44.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.78
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     136.07
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     23.00 =    3164.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.90      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =     46.89   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       49.9       PEAK FLOW RATE(CFS) =     136.07
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.90  DOWNSTREAM(FEET) =   339.50
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.17
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     136.07
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     24.00 =    3220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               C       4.50      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   12.73
  EFFECTIVE AREA(ACRES) =     51.39   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       54.4       PEAK FLOW RATE(CFS) =     144.84

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.50  DOWNSTREAM(FEET) =   333.30
  FLOW LENGTH(FEET) =   505.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.03
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     144.84
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   10.75
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     25.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               A       1.40      0.40     0.350    32
  CONDOMINIUMS               C       8.80      0.25     0.350    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   27.84
  EFFECTIVE AREA(ACRES) =     61.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       64.6       PEAK FLOW RATE(CFS) =     167.90

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.30  DOWNSTREAM(FEET) =   331.50
  FLOW LENGTH(FEET) =   177.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.69
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     167.90
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE     19.10 TO NODE     26.00 =    3902.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       64.6  TC(MIN.) =     10.97
  EFFECTIVE AREA(ACRES) =     61.59  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap = 0.356
  PEAK FLOW RATE(CFS)   =     167.90

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     167.90   10.97    3.092  0.28( 0.10) 0.36      61.6      10.00
      2     165.35   11.46    3.017  0.28( 0.10) 0.36      62.2      18.10
      3     148.43   14.58    2.632  0.27( 0.10) 0.37      64.6      19.10
      4     147.59   14.74    2.616  0.27( 0.10) 0.37      64.6      14.10
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                           15535 Sand Canyon Ave
                                 Suite 100
                              Irvine, CA 92618

 ************************** DESCRIPTION OF STUDY **************************
* GATEWAY VILLAGE PROPOSED HYDROLOGY                                       *
* SUBAREA 'F' 25 YEAR STORM                                                *
* 11/19/2024                                                               *
 **************************************************************************

  FILE NAME: GVFPR25.DAT
  TIME/DATE OF STUDY: 09:39 11/25/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.60  DOWNSTREAM(FEET) =    347.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.914
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.720
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS               B        0.40      0.30     0.350    56    7.91
 CONDOMINIUMS               C        3.00      0.25     0.350    69    7.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =     11.11
 TOTAL AREA(ACRES) =      3.40   PEAK FLOW RATE(CFS) =     11.11

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    347.60  DOWNSTREAM(FEET) =    343.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.10      0.30     0.350    56
 CONDOMINIUMS               C        2.40      0.25     0.350    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.40
 AVERAGE FLOW DEPTH(FEET) =   1.20   TRAVEL TIME(MIN.) =   1.92
 Tc(MIN.) =    9.83
 SUBAREA AREA(ACRES) =     2.50       SUBAREA RUNOFF(CFS) =    7.20
 EFFECTIVE AREA(ACRES) =      5.90     AREA-AVERAGED Fm(INCH/HR) =   0.09
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.35
 TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      17.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.27   FLOW VELOCITY(FEET/SEC.) =   3.52
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     721.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   337.70  DOWNSTREAM(FEET) =   337.20
 FLOW LENGTH(FEET) =   131.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.00
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.24
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     852.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.24
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.215
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       0.50      0.40     0.100    32
 COMMERCIAL                 C       0.30      0.25     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.29
 EFFECTIVE AREA(ACRES) =      6.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      18.89

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   337.20  DOWNSTREAM(FEET) =   336.25
 FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.89
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.51
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     970.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     10.51
 EFFECTIVE AREA(ACRES) =      6.70  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap = 0.320
 PEAK FLOW RATE(CFS)   =     18.89
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 6

Detention Basin Sizing and Routing Calculations

```
****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  GATEWAY VILLAGE PROPOSED HYDROLOGY
  SUBAREA 'D6' 25-YEAR STORM
  12/3/2024 BY CK
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.49 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1          3.80       35.00            32.        0.400       0.616
        2          4.30       35.00            69.        0.250       0.740
        3          0.20       35.00            75.        0.200       0.775

    TOTAL AREA (Acres) =      8.30

    AREA-AVERAGED LOSS RATE, F̅m (in./hr.) =  0.111

    AREA-AVERAGED LOW LOSS FRACTION, Y̅ = 0.316
============================================================================
```

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                           Analysis prepared by:




****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  GATEWAY VILLAGE PROPOSED HYDROLOGY
  SUBAREA 'D6' 25-YEAR STORM UH
  12/3/2024 BY CK
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    8.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.111
    LOW LOSS FRACTION = 0.316
    TIME OF CONCENTRATION(MIN.) = 19.44
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.09
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.02

****************************************************************************
  TIME     VOLUME      Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.12      0.0018      0.35  Q         .         .         .         .
  0.45      0.0112      0.35  Q         .         .         .         .
  0.77      0.0207      0.36  Q         .         .         .         .
  1.10      0.0303      0.36  Q         .         .         .         .
  1.42      0.0401      0.37  Q         .         .         .         .
  1.74      0.0500      0.37  Q         .         .         .         .
  2.07      0.0600      0.38  Q         .         .         .         .
  2.39      0.0702      0.38  Q         .         .         .         .
  2.72      0.0806      0.39  Q         .         .         .         .
  3.04      0.0911      0.39  Q         .         .         .         .
  3.36      0.1017      0.40  Q         .         .         .         .
  3.69      0.1125      0.41  Q         .         .         .         .
  4.01      0.1236      0.42  Q         .         .         .         .
  4.34      0.1348      0.42  Q         .         .         .         .
  4.66      0.1462      0.43  Q         .         .         .         .
  4.98      0.1578      0.44  Q         .         .         .         .
  5.31      0.1696      0.45  Q         .         .         .         .
```

```
  5.63      0.1816      0.45  Q         .         .         .         .
  5.96      0.1939      0.46  Q         .         .         .         .
  6.28      0.2064      0.47  Q         .         .         .         .
  6.60      0.2192      0.48  Q         .         .         .         .
  6.93      0.2322      0.49  Q         .         .         .         .
  7.25      0.2456      0.51  .Q        .         .         .         .
  7.58      0.2592      0.51  .Q        .         .         .         .
  7.90      0.2732      0.53  .Q        .         .         .         .
  8.22      0.2876      0.54  .Q        .         .         .         .
  8.55      0.3023      0.56  .Q        .         .         .         .
  8.87      0.3174      0.57  .Q        .         .         .         .
  9.20      0.3329      0.59  .Q        .         .         .         .
  9.52      0.3489      0.60  .Q        .         .         .         .
  9.84      0.3654      0.63  .Q        .         .         .         .
 10.17      0.3824      0.64  .Q        .         .         .         .
 10.49      0.4000      0.67  .Q        .         .         .         .
 10.82      0.4183      0.69  .Q        .         .         .         .
 11.14      0.4372      0.73  .Q        .         .         .         .
 11.46      0.4569      0.75  .Q        .         .         .         .
 11.79      0.4775      0.79  .Q        .         .         .         .
 12.11      0.4991      0.82  .Q        .         .         .         .
 12.44      0.5255      1.15  . Q       .         .         .         .
 12.76      0.5568      1.19  . Q       .         .         .         .
 13.08      0.5897      1.27  . Q       .         .         .         .
 13.41      0.6244      1.32  . Q       .         .         .         .
 13.73      0.6612      1.43  . Q       .         .         .         .
 14.06      0.7005      1.50  .  Q      .         .         .         .
 14.38      0.7428      1.65  .  Q      .         .         .         .
 14.70      0.7886      1.77  .  Q      .         .         .         .
 15.03      0.8418      2.21  .   Q     .         .         .         .
 15.35      0.9054      2.55  .    Q    .         .         .         .
 15.68      0.9815      3.14  .     Q   .         .         .         .
 16.00      1.0884      4.84  .        Q.         .         .         .
 16.32      1.3658     15.88  .         .         .         .Q        .
 16.65      1.6181      2.97  .    Q    .         .         .         .
 16.97      1.6840      1.95  .  Q      .         .         .         .
 17.30      1.7313      1.58  .  Q      .         .         .         .
 17.62      1.7707      1.37  . Q       .         .         .         .
 17.94      1.8055      1.23  . Q       .         .         .         .
 18.27      1.8352      0.99  .Q        .         .         .         .
 18.59      1.8587      0.77  .Q        .         .         .         .
 18.92      1.8785      0.71  .Q        .         .         .         .
 19.24      1.8968      0.66  .Q        .         .         .         .
 19.56      1.9138      0.62  .Q        .         .         .         .
 19.89      1.9298      0.58  .Q        .         .         .         .
 20.21      1.9449      0.55  .Q        .         .         .         .
 20.54      1.9593      0.52  .Q        .         .         .         .
 20.86      1.9729      0.50  Q         .         .         .         .
 21.18      1.9860      0.48  Q         .         .         .         .
 21.51      1.9985      0.46  Q         .         .         .         .
 21.83      2.0105      0.44  Q         .         .         .         .
 22.16      2.0221      0.43  Q         .         .         .         .
 22.48      2.0334      0.41  Q         .         .         .         .
 22.80      2.0442      0.40  Q         .         .         .         .
 23.13      2.0547      0.39  Q         .         .         .         .
 23.45      2.0649      0.37  Q         .         .         .         .
 23.78      2.0748      0.36  Q         .         .         .         .
 24.10      2.0844      0.35  Q         .         .         .         .
 24.42      2.0892      0.00  Q         .         .         .         .
 ----------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)
```

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1458.0
10%	175.0
20%	38.9
30%	38.9
40%	19.4
50%	19.4
60%	19.4
70%	19.4
80%	19.4
90%	19.4

```
****************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                          Analysis prepared by:




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 Problem Descriptions:
  GATEWAY VILLAGE PROPOSED HYDROLOGY
  SUBAREA 'D6' 25-YEAR STORM UH
  12/3/2024 BY CK
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    8.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.111
    LOW LOSS FRACTION = 0.316
    TIME OF CONCENTRATION(MIN.) = 19.44
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.09
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.02

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.12      0.0018      0.35  Q         .         .         .         .
  0.45      0.0112      0.35  Q         .         .         .         .
  0.77      0.0207      0.36  Q         .         .         .         .
  1.10      0.0303      0.36  Q         .         .         .         .
  1.42      0.0401      0.37  Q         .         .         .         .
  1.74      0.0500      0.37  Q         .         .         .         .
  2.07      0.0600      0.38  Q         .         .         .         .
  2.39      0.0702      0.38  Q         .         .         .         .
  2.72      0.0806      0.39  Q         .         .         .         .
  3.04      0.0911      0.39  Q         .         .         .         .
  3.36      0.1017      0.40  Q         .         .         .         .
  3.69      0.1125      0.41  Q         .         .         .         .
  4.01      0.1236      0.42  Q         .         .         .         .
  4.34      0.1348      0.42  Q         .         .         .         .
  4.66      0.1462      0.43  Q         .         .         .         .
  4.98      0.1578      0.44  Q         .         .         .         .
  5.31      0.1696      0.45  Q         .         .         .         .
```

```
   5.63      0.1816      0.45  Q         .         .         .         .
   5.96      0.1939      0.46  Q         .         .         .         .
   6.28      0.2064      0.47  Q         .         .         .         .
   6.60      0.2192      0.48  Q         .         .         .         .
   6.93      0.2322      0.49  Q         .         .         .         .
   7.25      0.2456      0.51  .Q        .         .         .         .
   7.58      0.2592      0.51  .Q        .         .         .         .
   7.90      0.2732      0.53  .Q        .         .         .         .
   8.22      0.2876      0.54  .Q        .         .         .         .
   8.55      0.3023      0.56  .Q        .         .         .         .
   8.87      0.3174      0.57  .Q        .         .         .         .
   9.20      0.3329      0.59  .Q        .         .         .         .
   9.52      0.3489      0.60  .Q        .         .         .         .
   9.84      0.3654      0.63  .Q        .         .         .         .
  10.17      0.3824      0.64  .Q        .         .         .         .
  10.49      0.4000      0.67  .Q        .         .         .         .
  10.82      0.4183      0.69  .Q        .         .         .         .
  11.14      0.4372      0.73  .Q        .         .         .         .
  11.46      0.4569      0.75  .Q        .         .         .         .
  11.79      0.4775      0.79  .Q        .         .         .         .
  12.11      0.4991      0.82  .Q        .         .         .         .
  12.44      0.5255      1.15  . Q       .         .         .         .
  12.76      0.5568      1.19  . Q       .         .         .         .
  13.08      0.5897      1.27  . Q       .         .         .         .
  13.41      0.6244      1.32  . Q       .         .         .         .
  13.73      0.6612      1.43  . Q       .         .         .         .
  14.06      0.7005      1.50  .  Q      .         .         .         .
  14.38      0.7428      1.65  .  Q      .         .         .         .
  14.70      0.7886      1.77  .  Q      .         .         .         .
  15.03      0.8418      2.21  .   Q     .         .         .         .
  15.35      0.9054      2.55  .    Q    .         .         .         .
  15.68      0.9815      3.14  .     Q   .         .         .         .
  16.00      1.0884      4.84  .        Q.         .         .         .
  16.32      1.3658     15.88  .         .         .         .Q        .
  16.65      1.6181      2.97  .    Q    .         .         .         .
  16.97      1.6840      1.95  .  Q      .         .         .         .
  17.30      1.7313      1.58  .  Q      .         .         .         .
  17.62      1.7707      1.37  . Q       .         .         .         .
  17.94      1.8055      1.23  . Q       .         .         .         .
  18.27      1.8352      0.99  .Q        .         .         .         .
  18.59      1.8587      0.77  .Q        .         .         .         .
  18.92      1.8785      0.71  .Q        .         .         .         .
  19.24      1.8968      0.66  .Q        .         .         .         .
  19.56      1.9138      0.62  .Q        .         .         .         .
  19.89      1.9298      0.58  .Q        .         .         .         .
  20.21      1.9449      0.55  .Q        .         .         .         .
  20.54      1.9593      0.52  .Q        .         .         .         .
  20.86      1.9729      0.50  Q         .         .         .         .
  21.18      1.9860      0.48  Q         .         .         .         .
  21.51      1.9985      0.46  Q         .         .         .         .
  21.83      2.0105      0.44  Q         .         .         .         .
  22.16      2.0221      0.43  Q         .         .         .         .
  22.48      2.0334      0.41  Q         .         .         .         .
  22.80      2.0442      0.40  Q         .         .         .         .
  23.13      2.0547      0.39  Q         .         .         .         .
  23.45      2.0649      0.37  Q         .         .         .         .
  23.78      2.0748      0.36  Q         .         .         .         .
  24.10      2.0844      0.35  Q         .         .         .         .
  24.42      2.0892      0.00  Q         .         .         .         .
 -----------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)
```

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1458.0
10%	175.0
20%	38.9
30%	38.9
40%	19.4
50%	19.4
60%	19.4
70%	19.4
80%	19.4
90%	19.4

Problem Descriptions:
GATEWAY VILLAGE PROPOSED HYDROLOGY
SUBAREA 'D6' 25-YEAR STORM UH
12/3/2024 BY CK

==

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 19.440
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

```
              INFLOW
                |
                |
                |
                V               __effective depth
          -------------         |   (and volume)
          |           |     |   |
          | detention |     |....V.............
          |   basin   |<-->|          outflow
          |           |     |.........________
          -------------     |         |   \
                |           | storage |    basin outlet
                V           -----------
             OUTFLOW
```

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 20

BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)
0.000	0.000	0.000	0.370	0.021	0.390
0.740	0.042	1.480	1.110	0.063	2.940
1.470	0.085	3.730	1.840	0.106	4.380
2.210	0.127	4.950	2.580	0.148	5.450
2.950	0.169	5.920	3.320	0.190	6.350
3.680	0.211	6.750	4.050	0.233	7.130
4.420	0.254	7.490	4.790	0.275	7.830
5.160	0.296	8.160	5.530	0.317	8.480
5.890	0.338	8.870	6.260	0.359	9.080
6.630	0.381	9.360	7.000	0.402	9.640

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)

1	0.00	0.00000	0.00000
2	0.37	0.01588	0.02632
3	0.74	0.02249	0.06211
4	1.11	0.02404	0.10276
5	1.47	0.03466	0.13454
6	1.84	0.04706	0.16434
7	2.21	0.06063	0.19317
8	2.58	0.07503	0.22097
9	2.95	0.08994	0.24846
10	3.32	0.10528	0.27532
11	3.68	0.12103	0.30177
12	4.05	0.13714	0.32806
13	4.42	0.15342	0.35398
14	4.79	0.17007	0.37973
15	5.16	0.18675	0.40525
16	5.53	0.20367	0.43073
17	5.89	0.21954	0.45706
18	6.26	0.23793	0.48107
19	6.63	0.25528	0.50592
20	7.00	0.27264	0.53076

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.124	0.000	0.35	0.13	0.07	0.008
0.448	0.000	0.35	0.21	0.18	0.012
0.772	0.000	0.36	0.26	0.25	0.015
1.096	0.000	0.36	0.29	0.29	0.017
1.420	0.000	0.37	0.32	0.32	0.018
1.744	0.000	0.37	0.33	0.34	0.019
2.068	0.000	0.38	0.34	0.35	0.019
2.392	0.000	0.38	0.35	0.36	0.020
2.716	0.000	0.39	0.36	0.37	0.020
3.040	0.000	0.39	0.36	0.38	0.021
3.364	0.000	0.40	0.37	0.39	0.021
3.688	0.000	0.41	0.37	0.40	0.021
4.012	0.000	0.42	0.38	0.41	0.022
4.336	0.000	0.42	0.38	0.42	0.022
4.660	0.000	0.43	0.38	0.42	0.022
4.984	0.000	0.44	0.39	0.43	0.022
5.308	0.000	0.45	0.39	0.44	0.022
5.632	0.000	0.45	0.39	0.45	0.022
5.956	0.000	0.46	0.39	0.46	0.022
6.280	0.000	0.47	0.40	0.47	0.023
6.604	0.000	0.48	0.40	0.48	0.023
6.928	0.000	0.49	0.40	0.49	0.023
7.252	0.000	0.51	0.41	0.50	0.023
7.576	0.000	0.51	0.41	0.51	0.023
7.900	0.000	0.53	0.42	0.52	0.024
8.224	0.000	0.54	0.42	0.53	0.024
8.548	0.000	0.56	0.43	0.55	0.024
8.872	0.000	0.57	0.43	0.56	0.025
9.196	0.000	0.59	0.44	0.58	0.025
9.520	0.000	0.60	0.44	0.59	0.025
9.844	0.000	0.63	0.45	0.61	0.026
10.168	0.000	0.64	0.45	0.63	0.026
10.492	0.000	0.67	0.46	0.65	0.026
10.816	0.000	0.69	0.47	0.68	0.027
11.140	0.000	0.73	0.48	0.70	0.027

11.464	0.000	0.75	0.49	0.73	0.028
11.788	0.000	0.79	0.50	0.76	0.029
12.112	0.000	0.82	0.51	0.80	0.029
12.436	0.000	1.15	0.61	0.95	0.035
12.760	0.000	1.19	0.63	1.13	0.036
13.084	0.000	1.27	0.66	1.21	0.038
13.408	0.000	1.32	0.68	1.28	0.039
13.732	0.000	1.43	0.72	1.36	0.041
14.056	0.000	1.50	0.74	1.45	0.042
14.380	0.000	1.65	0.78	1.57	0.045
14.704	0.000	1.77	0.81	1.71	0.046
15.028	0.000	2.21	0.92	1.98	0.053
15.352	0.000	2.55	1.01	2.36	0.058
15.676	0.000	3.14	1.16	2.80	0.067
16.000	0.000	4.84	1.73	3.62	0.099
16.324	0.000	15.88	6.07	6.58	0.348
16.648	0.000	2.97	3.77	7.90	0.216
16.972	0.000	1.95	2.00	5.73	0.115
17.296	0.000	1.58	1.04	3.65	0.059
17.620	0.000	1.37	0.72	2.05	0.041
17.944	0.000	1.23	0.67	1.35	0.038
18.268	0.000	0.99	0.59	1.15	0.034
18.592	0.000	0.77	0.52	0.93	0.029
18.916	0.000	0.71	0.48	0.77	0.028
19.240	0.000	0.66	0.47	0.70	0.027
19.564	0.000	0.62	0.45	0.65	0.026
19.888	0.000	0.58	0.44	0.61	0.025
20.212	0.000	0.55	0.43	0.57	0.024
20.536	0.000	0.52	0.42	0.54	0.024
20.860	0.000	0.50	0.41	0.52	0.023
21.184	0.000	0.48	0.40	0.49	0.023
21.508	0.000	0.46	0.39	0.47	0.023
21.832	0.000	0.44	0.39	0.45	0.022
22.156	0.000	0.43	0.38	0.44	0.022
22.480	0.000	0.41	0.38	0.42	0.022
22.804	0.000	0.40	0.37	0.41	0.021
23.128	0.000	0.39	0.37	0.40	0.021
23.452	0.000	0.37	0.36	0.39	0.021
23.776	0.000	0.36	0.36	0.38	0.020
24.100	0.000	0.35	0.35	0.37	0.020
24.424	0.000	0.00	0.21	0.29	0.012
24.748	0.000	0.00	0.13	0.18	0.007
25.072	0.000	0.00	0.08	0.11	0.004
25.396	0.000	0.00	0.05	0.06	0.003
25.720	0.000	0.00	0.03	0.04	0.002
26.044	0.000	0.00	0.02	0.02	0.001

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          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:





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----------------------------------------------------------------------------

 Problem Descriptions:
  GATEWAY VILLAGE PROPOSED HYDROMOD
  SUBAREAS D6 & D7 2-YEAR STORM
  12/5/2024 BY CK
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA    NUMBER    Fp(in./hr.)    YIELD
         1          3.80       35.00       32.(AMC II)     0.400       0.578
         2          4.30       35.00       69.(AMC II)     0.250       0.578
         3          0.20       35.00       75.(AMC II)     0.200       0.585

    TOTAL AREA (Acres) =      8.30

    AREA-AVERAGED LOSS RATE, F̄m (in./hr.) =  0.111

    AREA-AVERAGED LOW LOSS FRACTION, Ȳ = 0.422
============================================================================
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                     SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                          Analysis prepared by:





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----------------------------------------------------------------------------

 Problem Descriptions:
  GATEWAY VILLAGE PROPOSED HYDROMOD
  SUBAREAS D6 & D7 2-YEAR STORM UH
  12/5/2024 BY CK
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    8.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.111
    LOW LOSS FRACTION = 0.422
    TIME OF CONCENTRATION(MIN.) = 10.09
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.80
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.61

****************************************************************************
  TIME     VOLUME       Q    0.         5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.02      0.0000      0.00  Q          .         .         .         .
  0.19      0.0010      0.14  Q          .         .         .         .
  0.36      0.0029      0.14  Q          .         .         .         .
  0.53      0.0048      0.14  Q          .         .         .         .
  0.70      0.0068      0.14  Q          .         .         .         .
  0.86      0.0088      0.14  Q          .         .         .         .
  1.03      0.0107      0.14  Q          .         .         .         .
  1.20      0.0127      0.14  Q          .         .         .         .
  1.37      0.0147      0.15  Q          .         .         .         .
  1.54      0.0168      0.15  Q          .         .         .         .
  1.71      0.0188      0.15  Q          .         .         .         .
  1.87      0.0209      0.15  Q          .         .         .         .
  2.04      0.0229      0.15  Q          .         .         .         .
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2.21	0.0250	0.15	Q	.	.	.	.
2.38	0.0271	0.15	Q	.	.	.	.
2.55	0.0292	0.15	Q	.	.	.	.
2.71	0.0314	0.15	Q	.	.	.	.
2.88	0.0335	0.16	Q	.	.	.	.
3.05	0.0357	0.16	Q	.	.	.	.
3.22	0.0379	0.16	Q	.	.	.	.
3.39	0.0401	0.16	Q	.	.	.	.
3.56	0.0423	0.16	Q	.	.	.	.
3.72	0.0445	0.16	Q	.	.	.	.
3.89	0.0468	0.16	Q	.	.	.	.
4.06	0.0491	0.16	Q	.	.	.	.
4.23	0.0514	0.17	Q	.	.	.	.
4.40	0.0537	0.17	Q	.	.	.	.
4.56	0.0560	0.17	Q	.	.	.	.
4.73	0.0584	0.17	Q	.	.	.	.
4.90	0.0608	0.17	Q	.	.	.	.
5.07	0.0632	0.17	Q	.	.	.	.
5.24	0.0656	0.18	Q	.	.	.	.
5.41	0.0681	0.18	Q	.	.	.	.
5.57	0.0705	0.18	Q	.	.	.	.
5.74	0.0730	0.18	Q	.	.	.	.
5.91	0.0756	0.18	Q	.	.	.	.
6.08	0.0781	0.18	Q	.	.	.	.
6.25	0.0807	0.19	Q	.	.	.	.
6.41	0.0833	0.19	Q	.	.	.	.
6.58	0.0859	0.19	Q	.	.	.	.
6.75	0.0886	0.19	Q	.	.	.	.
6.92	0.0913	0.19	Q	.	.	.	.
7.09	0.0940	0.20	Q	.	.	.	.
7.26	0.0968	0.20	Q	.	.	.	.
7.42	0.0995	0.20	Q	.	.	.	.
7.59	0.1024	0.20	Q	.	.	.	.
7.76	0.1052	0.21	Q	.	.	.	.
7.93	0.1081	0.21	Q	.	.	.	.
8.10	0.1111	0.21	Q	.	.	.	.
8.26	0.1140	0.21	Q	.	.	.	.
8.43	0.1170	0.22	Q	.	.	.	.
8.60	0.1201	0.22	Q	.	.	.	.
8.77	0.1232	0.22	Q	.	.	.	.
8.94	0.1263	0.23	Q	.	.	.	.
9.11	0.1295	0.23	Q	.	.	.	.
9.27	0.1327	0.23	Q	.	.	.	.
9.44	0.1360	0.24	Q	.	.	.	.
9.61	0.1394	0.24	Q	.	.	.	.
9.78	0.1427	0.25	Q	.	.	.	.
9.95	0.1462	0.25	Q	.	.	.	.
10.11	0.1497	0.26	Q	.	.	.	.
10.28	0.1533	0.26	Q	.	.	.	.
10.45	0.1569	0.26	Q	.	.	.	.
10.62	0.1606	0.27	Q	.	.	.	.
10.79	0.1644	0.27	Q	.	.	.	.
10.95	0.1682	0.28	Q	.	.	.	.
11.12	0.1721	0.29	Q	.	.	.	.
11.29	0.1761	0.29	Q	.	.	.	.
11.46	0.1802	0.30	Q	.	.	.	.
11.63	0.1844	0.30	Q	.	.	.	.
11.80	0.1887	0.31	Q	.	.	.	.
11.96	0.1931	0.32	Q	.	.	.	.
12.13	0.1979	0.38	Q	.	.	.	.
12.30	0.2034	0.41	Q	.	.	.	.

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12.47      0.2091      0.42  Q          .         .         .         .
12.64      0.2150      0.43  Q          .         .         .         .
12.80      0.2211      0.44  Q          .         .         .         .
12.97      0.2273      0.45  Q          .         .         .         .
13.14      0.2337      0.47  Q          .         .         .         .
13.31      0.2403      0.48  Q          .         .         .         .
13.48      0.2471      0.50  .Q         .         .         .         .
13.65      0.2542      0.51  .Q         .         .         .         .
13.81      0.2615      0.54  .Q         .         .         .         .
13.98      0.2691      0.56  .Q         .         .         .         .
14.15      0.2772      0.61  .Q         .         .         .         .
14.32      0.2858      0.63  .Q         .         .         .         .
14.49      0.2949      0.67  .Q         .         .         .         .
14.65      0.3044      0.70  .Q         .         .         .         .
14.82      0.3146      0.76  .Q         .         .         .         .
14.99      0.3254      0.80  .Q         .         .         .         .
15.16      0.3372      0.89  .Q         .         .         .         .
15.33      0.3501      0.96  .Q         .         .         .         .
15.50      0.3635      0.98  .Q         .         .         .         .
15.66      0.3780      1.10  . Q        .         .         .         .
15.83      0.3991      1.93  .   Q      .         .         .         .
16.00      0.4329      2.94  .     Q    .         .         .         .
16.17      0.5261     10.47  .          .         Q         .         .
16.34      0.6085      1.38  . Q        .         .         .         .
16.50      0.6252      1.03  . Q        .         .         .         .
16.67      0.6383      0.84  .Q         .         .         .         .
16.84      0.6492      0.73  .Q         .         .         .         .
17.01      0.6588      0.65  .Q         .         .         .         .
17.18      0.6673      0.57  .Q         .         .         .         .
17.35      0.6749      0.53  .Q         .         .         .         .
17.51      0.6820      0.49  Q          .         .         .         .
17.68      0.6886      0.46  Q          .         .         .         .
17.85      0.6948      0.44  Q          .         .         .         .
18.02      0.7007      0.41  Q          .         .         .         .
18.19      0.7058      0.32  Q          .         .         .         .
18.35      0.7102      0.31  Q          .         .         .         .
18.52      0.7144      0.29  Q          .         .         .         .
18.69      0.7184      0.28  Q          .         .         .         .
18.86      0.7223      0.27  Q          .         .         .         .
19.03      0.7260      0.26  Q          .         .         .         .
19.20      0.7295      0.25  Q          .         .         .         .
19.36      0.7330      0.24  Q          .         .         .         .
19.53      0.7363      0.24  Q          .         .         .         .
19.70      0.7395      0.23  Q          .         .         .         .
19.87      0.7427      0.22  Q          .         .         .         .
20.04      0.7457      0.22  Q          .         .         .         .
20.20      0.7487      0.21  Q          .         .         .         .
20.37      0.7516      0.21  Q          .         .         .         .
20.54      0.7544      0.20  Q          .         .         .         .
20.71      0.7572      0.20  Q          .         .         .         .
20.88      0.7599      0.19  Q          .         .         .         .
21.05      0.7625      0.19  Q          .         .         .         .
21.21      0.7651      0.18  Q          .         .         .         .
21.38      0.7676      0.18  Q          .         .         .         .
21.55      0.7701      0.18  Q          .         .         .         .
21.72      0.7725      0.17  Q          .         .         .         .
21.89      0.7749      0.17  Q          .         .         .         .
22.05      0.7772      0.17  Q          .         .         .         .
22.22      0.7795      0.16  Q          .         .         .         .
22.39      0.7818      0.16  Q          .         .         .         .
22.56      0.7840      0.16  Q          .         .         .         .
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 22.73      0.7862      0.16  Q         .         .         .         .
 22.89      0.7884      0.15  Q         .         .         .         .
 23.06      0.7905      0.15  Q         .         .         .         .
 23.23      0.7926      0.15  Q         .         .         .         .
 23.40      0.7946      0.15  Q         .         .         .         .
 23.57      0.7966      0.14  Q         .         .         .         .
 23.74      0.7986      0.14  Q         .         .         .         .
 23.90      0.8006      0.14  Q         .         .         .         .
 24.07      0.8025      0.14  Q         .         .         .         .
 24.24      0.8035      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
-------------------------------------------------------------------------------
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TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1442.9
10%	50.5
20%	20.2
30%	10.1
40%	10.1
50%	10.1
60%	10.1
70%	10.1
80%	10.1
90%	10.1

Problem Descriptions:
GATEWAY VILLAGE PROPOSED HYDROMOD
SUBAREAS D6 & D7 2-YEAR STORM UH DETENTION
12/5/2024 BY CK

==

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   10.090
DEAD STORAGE(AF) =   0.00
SPECIFIED DEAD STORAGE(AF) FILLED =   0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =   0.00

```
                INFLOW
                  |
                  |
                  |
                  V             __effective depth
             -------------      |   (and volume)
             |           |    |    |
             | detention |    |....V..............
             |   basin   |<-->|         outflow
             |           |    |.........__________
             -------------    |          |   \
                  |           | storage |    basin outlet
                  V           -----------
```

OUTFLOW

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 20

BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)
0.000	0.000	0.000	0.370	0.021	0.390
0.740	0.042	1.480	1.110	0.063	2.940
1.470	0.085	3.730	1.840	0.106	4.380
2.210	0.129	4.950	2.580	0.148	5.450
2.950	0.169	5.920	3.320	0.190	6.350
3.680	0.211	6.750	4.050	0.233	7.130
4.420	0.254	7.490	4.790	0.275	7.830
5.160	0.296	8.160	5.530	0.317	8.480
5.890	0.338	8.870	6.260	0.359	9.080
6.630	0.381	9.360	7.000	0.402	9.640

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.37	0.01839	0.02381
3	0.74	0.03202	0.05258
4	1.11	0.04297	0.08383
5	1.47	0.05868	0.11052
6	1.84	0.07526	0.13614
7	2.21	0.09450	0.16330
8	2.58	0.11013	0.18587
9	2.95	0.12806	0.21034
10	3.32	0.14617	0.23443
11	3.68	0.16449	0.25831
12	4.05	0.18305	0.28215
13	4.42	0.20165	0.30575
14	4.79	0.22049	0.32931
15	5.16	0.23930	0.35270
16	5.53	0.25827	0.37613
17	5.89	0.27666	0.39994
18	6.26	0.29640	0.42260
19	6.63	0.31556	0.44564
20	7.00	0.33471	0.46869

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.024	0.000	0.00	0.00	0.00	0.000
0.192	0.000	0.14	0.03	0.02	0.002
0.360	0.000	0.14	0.05	0.04	0.003
0.529	0.000	0.14	0.07	0.07	0.004
0.697	0.000	0.14	0.09	0.08	0.005
0.865	0.000	0.14	0.10	0.10	0.006
1.033	0.000	0.14	0.11	0.11	0.006
1.201	0.000	0.14	0.11	0.12	0.006
1.369	0.000	0.15	0.12	0.12	0.007
1.538	0.000	0.15	0.12	0.13	0.007

1.706	0.000	0.15	0.13	0.13	0.007
1.874	0.000	0.15	0.13	0.14	0.007
2.042	0.000	0.15	0.13	0.14	0.008
2.210	0.000	0.15	0.13	0.14	0.008
2.378	0.000	0.15	0.14	0.14	0.008
2.547	0.000	0.15	0.14	0.15	0.008
2.715	0.000	0.15	0.14	0.15	0.008
2.883	0.000	0.16	0.14	0.15	0.008
3.051	0.000	0.16	0.14	0.15	0.008
3.219	0.000	0.16	0.14	0.15	0.008
3.387	0.000	0.16	0.15	0.15	0.008
3.556	0.000	0.16	0.15	0.15	0.008
3.724	0.000	0.16	0.15	0.16	0.008
3.892	0.000	0.16	0.15	0.16	0.009
4.060	0.000	0.16	0.15	0.16	0.009
4.228	0.000	0.17	0.15	0.16	0.009
4.396	0.000	0.17	0.15	0.16	0.009
4.565	0.000	0.17	0.16	0.16	0.009
4.733	0.000	0.17	0.16	0.16	0.009
4.901	0.000	0.17	0.16	0.17	0.009
5.069	0.000	0.17	0.16	0.17	0.009
5.237	0.000	0.18	0.16	0.17	0.009
5.405	0.000	0.18	0.16	0.17	0.009
5.574	0.000	0.18	0.16	0.17	0.009
5.742	0.000	0.18	0.17	0.17	0.009
5.910	0.000	0.18	0.17	0.18	0.010
6.078	0.000	0.18	0.17	0.18	0.010
6.246	0.000	0.19	0.17	0.18	0.010
6.414	0.000	0.19	0.17	0.18	0.010
6.583	0.000	0.19	0.17	0.18	0.010
6.751	0.000	0.19	0.18	0.19	0.010
6.919	0.000	0.19	0.18	0.19	0.010
7.087	0.000	0.20	0.18	0.19	0.010
7.255	0.000	0.20	0.18	0.19	0.010
7.424	0.000	0.20	0.18	0.19	0.011
7.592	0.000	0.20	0.19	0.20	0.011
7.760	0.000	0.21	0.19	0.20	0.011
7.928	0.000	0.21	0.19	0.20	0.011
8.096	0.000	0.21	0.19	0.20	0.011
8.264	0.000	0.21	0.20	0.21	0.011
8.432	0.000	0.22	0.20	0.21	0.011
8.601	0.000	0.22	0.20	0.21	0.011
8.769	0.000	0.22	0.20	0.21	0.012
8.937	0.000	0.23	0.21	0.22	0.012
9.105	0.000	0.23	0.21	0.22	0.012
9.273	0.000	0.23	0.21	0.22	0.012
9.441	0.000	0.24	0.22	0.23	0.012
9.610	0.000	0.24	0.22	0.23	0.012
9.778	0.000	0.25	0.22	0.23	0.013
9.946	0.000	0.25	0.23	0.24	0.013
10.114	0.000	0.26	0.23	0.24	0.013
10.282	0.000	0.26	0.23	0.24	0.013
10.450	0.000	0.26	0.24	0.25	0.014
10.619	0.000	0.27	0.24	0.25	0.014
10.787	0.000	0.27	0.25	0.26	0.014
10.955	0.000	0.28	0.25	0.26	0.014
11.123	0.000	0.29	0.25	0.27	0.015
11.291	0.000	0.29	0.26	0.27	0.015
11.460	0.000	0.30	0.26	0.28	0.015
11.628	0.000	0.30	0.27	0.28	0.015
11.796	0.000	0.31	0.28	0.29	0.016

11.964	0.000	0.32	0.28	0.29	0.016
12.132	0.000	0.38	0.30	0.31	0.017
12.300	0.000	0.41	0.32	0.33	0.018
12.469	0.000	0.42	0.34	0.35	0.019
12.637	0.000	0.43	0.35	0.36	0.020
12.805	0.000	0.44	0.37	0.38	0.021
12.973	0.000	0.45	0.38	0.40	0.022
13.141	0.000	0.47	0.39	0.43	0.022
13.309	0.000	0.48	0.40	0.45	0.023
13.477	0.000	0.50	0.40	0.47	0.023
13.646	0.000	0.51	0.41	0.49	0.023
13.814	0.000	0.54	0.41	0.51	0.024
13.982	0.000	0.56	0.42	0.53	0.024
14.150	0.000	0.61	0.43	0.56	0.025
14.318	0.000	0.63	0.44	0.59	0.025
14.486	0.000	0.67	0.46	0.62	0.026
14.655	0.000	0.70	0.47	0.66	0.027
14.823	0.000	0.76	0.48	0.70	0.028
14.991	0.000	0.80	0.50	0.74	0.028
15.159	0.000	0.89	0.52	0.80	0.030
15.327	0.000	0.96	0.54	0.86	0.031
15.495	0.000	0.98	0.56	0.92	0.032
15.664	0.000	1.10	0.59	0.98	0.033
15.832	0.000	1.93	0.75	1.27	0.043
16.000	0.000	2.94	0.98	1.97	0.056
16.168	0.000	10.47	2.56	3.93	0.147
16.336	0.000	1.38	1.73	4.81	0.099
16.504	0.000	1.03	1.12	3.58	0.064
16.673	0.000	0.84	0.77	2.28	0.044
16.841	0.000	0.73	0.62	1.36	0.035
17.009	0.000	0.65	0.53	1.00	0.030
17.177	0.000	0.57	0.48	0.79	0.027
17.345	0.000	0.53	0.45	0.66	0.025
17.514	0.000	0.49	0.42	0.58	0.024
17.682	0.000	0.46	0.41	0.53	0.023
17.850	0.000	0.44	0.40	0.48	0.023
18.018	0.000	0.41	0.39	0.45	0.022
18.186	0.000	0.32	0.37	0.41	0.021
18.354	0.000	0.31	0.35	0.38	0.020
18.522	0.000	0.29	0.33	0.36	0.019
18.691	0.000	0.28	0.32	0.34	0.018
18.859	0.000	0.27	0.30	0.33	0.017
19.027	0.000	0.26	0.29	0.31	0.017
19.195	0.000	0.25	0.28	0.30	0.016
19.363	0.000	0.24	0.27	0.29	0.015
19.531	0.000	0.24	0.26	0.28	0.015
19.700	0.000	0.23	0.25	0.27	0.014
19.868	0.000	0.22	0.24	0.26	0.014
20.036	0.000	0.22	0.23	0.25	0.013
20.204	0.000	0.21	0.23	0.24	0.013
20.372	0.000	0.21	0.22	0.23	0.012
20.541	0.000	0.20	0.21	0.23	0.012
20.709	0.000	0.20	0.21	0.22	0.012
20.877	0.000	0.19	0.20	0.21	0.011
21.045	0.000	0.19	0.20	0.21	0.011
21.213	0.000	0.18	0.19	0.20	0.011
21.381	0.000	0.18	0.19	0.20	0.011
21.549	0.000	0.18	0.18	0.19	0.010
21.718	0.000	0.17	0.18	0.19	0.010
21.886	0.000	0.17	0.17	0.19	0.010
22.054	0.000	0.17	0.17	0.18	0.010

22.222	0.000	0.16	0.17	0.18	0.010
22.390	0.000	0.16	0.16	0.17	0.009
22.559	0.000	0.16	0.16	0.17	0.009
22.727	0.000	0.16	0.16	0.17	0.009
22.895	0.000	0.15	0.16	0.16	0.009
23.063	0.000	0.15	0.15	0.16	0.009
23.231	0.000	0.15	0.15	0.16	0.009
23.399	0.000	0.15	0.15	0.16	0.008
23.568	0.000	0.14	0.15	0.15	0.008
23.736	0.000	0.14	0.14	0.15	0.008
23.904	0.000	0.14	0.14	0.15	0.008
24.072	0.000	0.14	0.14	0.15	0.008
24.240	0.000	0.00	0.11	0.13	0.006
24.408	0.000	0.00	0.08	0.10	0.005
24.577	0.000	0.00	0.06	0.08	0.004
24.745	0.000	0.00	0.05	0.06	0.003
24.913	0.000	0.00	0.04	0.05	0.002
25.081	0.000	0.00	0.03	0.04	0.002
25.249	0.000	0.00	0.02	0.03	0.001
25.417	0.000	0.00	0.02	0.02	0.001

WATERSHED 'E'

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****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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                          Analysis prepared by:





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 Problem Descriptions:
  Gateway Hydrograph/ Detention Routing
  Proposed Condition
  2-year storm event
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1           6.90       35.00       32.(AMC II)     0.400       0.578
        2          11.10       35.00       56.(AMC II)     0.300       0.578
        3          33.60       35.00       69.(AMC II)     0.250       0.578
        4           1.70       10.00       32.(AMC II)     0.400       0.801
        5           1.00       10.00       56.(AMC II)     0.300       0.801
        6           5.30       10.00       69.(AMC II)     0.250       0.801
        7           3.60      100.00       80.(AMC II)     0.250       0.055
        8           1.40       85.00       69.(AMC II)     0.250       0.134

    TOTAL AREA (Acres) =     64.60
                             _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.101
                                     _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.433
============================================================================

 Problem Descriptions:
  Gateway Hydrograph/ Detention Routing
  Proposed Condition (calibration coef: 0.8653)
  2-year storm event
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =   64.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.101
    LOW LOSS FRACTION = 0.433
    TIME OF CONCENTRATION(MIN.) = 11.20
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.97
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     5.07

****************************************************************************
  TIME     VOLUME      Q    0.        20.0      40.0      60.0      80.0
 (HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
  0.13    0.0056      1.01  Q         .         .         .         .
  0.32    0.0213      1.02  Q         .         .         .         .
  0.51    0.0371      1.03  Q         .         .         .         .
  0.69    0.0530      1.03  Q         .         .         .         .
  0.88    0.0690      1.04  Q         .         .         .         .
  1.07    0.0852      1.05  Q         .         .         .         .
  1.25    0.1015      1.06  Q         .         .         .         .
  1.44    0.1179      1.07  Q         .         .         .         .
  1.63    0.1344      1.08  Q         .         .         .         .
  1.81    0.1511      1.08  Q         .         .         .         .
  2.00    0.1679      1.10  Q         .         .         .         .
  2.19    0.1849      1.10  Q         .         .         .         .
  2.37    0.2019      1.11  Q         .         .         .         .
  2.56    0.2192      1.12  Q         .         .         .         .
  2.75    0.2366      1.13  Q         .         .         .         .
  2.93    0.2541      1.14  Q         .         .         .         .
  3.12    0.2718      1.15  Q         .         .         .         .
  3.31    0.2897      1.16  Q         .         .         .         .
  3.49    0.3077      1.18  Q         .         .         .         .
  3.68    0.3259      1.18  Q         .         .         .         .
  3.87    0.3442      1.20  Q         .         .         .         .
  4.05    0.3628      1.20  Q         .         .         .         .
  4.24    0.3815      1.22  Q         .         .         .         .
  4.43    0.4004      1.23  Q         .         .         .         .
  4.61    0.4194      1.25  Q         .         .         .         .
  4.80    0.4387      1.25  Q         .         .         .         .
  4.99    0.4582      1.27  Q         .         .         .         .
  5.17    0.4779      1.28  Q         .         .         .         .
  5.36    0.4978      1.30  Q         .         .         .         .
  5.55    0.5179      1.31  Q         .         .         .         .
  5.73    0.5382      1.33  Q         .         .         .         .
  5.92    0.5588      1.34  Q         .         .         .         .
  6.11    0.5796      1.36  Q         .         .         .         .
  6.29    0.6006      1.37  Q         .         .         .         .
  6.48    0.6219      1.39  Q         .         .         .         .
  6.67    0.6435      1.40  Q         .         .         .         .
  6.85    0.6653      1.43  Q         .         .         .         .
  7.04    0.6874      1.44  Q         .         .         .         .
  7.23    0.7097      1.46  Q         .         .         .         .
  7.41    0.7324      1.48  Q         .         .         .         .
  7.60    0.7554      1.50  Q         .         .         .         .
  7.79    0.7787      1.52  Q         .         .         .         .
  7.97    0.8023      1.55  Q         .         .         .         .
  8.16    0.8263      1.56  Q         .         .         .         .
  8.35    0.8506      1.59  Q         .         .         .         .
  8.53    0.8752      1.61  Q         .         .         .         .
  8.72    0.9003      1.64  Q         .         .         .         .
  8.91    0.9258      1.66  Q         .         .         .         .
  9.09    0.9516      1.70  Q         .         .         .         .
  9.28    0.9779      1.71  Q         .         .         .         .
  9.47    1.0047      1.75  Q         .         .         .         .
  9.65    1.0319      1.77  Q         .         .         .         .
  9.84    1.0596      1.82  Q         .         .         .         .
 10.03    1.0879      1.84  Q         .         .         .         .
 10.21    1.1166      1.89  Q         .         .         .         .
 10.40    1.1460      1.92  Q         .         .         .         .
 10.59    1.1759      1.97  Q         .         .         .         .
 10.77    1.2065      2.00  Q         .         .         .         .
 10.96    1.2378      2.06  .Q        .         .         .         .
 11.15    1.2698      2.09  .Q        .         .         .         .
 11.33    1.3025      2.16  .Q        .         .         .         .
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11.52    1.3360     2.19  .Q        .         .         .         .
11.71    1.3704     2.27  .Q        .         .         .         .
11.89    1.4057     2.31  .Q        .         .         .         .
12.08    1.4426     2.47  .Q        .         .         .         .
12.27    1.4845     2.96  .Q        .         .         .         .
12.45    1.5310     3.07  .Q        .         .         .         .
12.64    1.5789     3.13  .Q        .         .         .         .
12.83    1.6282     3.26  .Q        .         .         .         .
13.01    1.6790     3.33  .Q        .         .         .         .
13.20    1.7315     3.48  .Q        .         .         .         .
13.39    1.7858     3.56  .Q        .         .         .         .
13.57    1.8421     3.75  .Q        .         .         .         .
13.76    1.9007     3.85  .Q        .         .         .         .
13.95    1.9620     4.08  . Q       .         .         .         .
14.13    2.0261     4.23  . Q       .         .         .         .
14.32    2.0948     4.68  . Q       .         .         .         .
14.51    2.1685     4.87  . Q       .         .         .         .
14.69    2.2469     5.30  . Q       .         .         .         .
14.88    2.3306     5.56  . Q       .         .         .         .
15.07    2.4214     6.21  .  Q      .         .         .         .
15.25    2.5205     6.64  .  Q      .         .         .         .
15.44    2.6292     7.46  .  Q      .         .         .         .
15.63    2.7463     7.72  .  Q      .         .         .         .
15.81    2.9114    13.69  .     Q   .         .         .         .
16.00    3.1782    20.90  .         Q         .         .         .
16.19    3.9094    73.90  .         .         .         .     Q   .
16.37    4.5558     9.89  .   Q     .         .         .         .
16.56    4.6873     7.16  .  Q      .         .         .         .
16.75    4.7877     5.86  . Q       .         .         .         .
16.93    4.8720     5.07  . Q       .         .         .         .
17.12    4.9460     4.52  . Q       .         .         .         .
17.31    5.0114     3.96  .Q        .         .         .         .
17.49    5.0702     3.65  .Q        .         .         .         .
17.68    5.1246     3.40  .Q        .         .         .         .
17.87    5.1754     3.19  .Q        .         .         .         .
18.05    5.2233     3.02  .Q        .         .         .         .
18.24    5.2647     2.35  .Q        .         .         .         .
18.43    5.3001     2.23  .Q        .         .         .         .
18.61    5.3336     2.12  .Q        .         .         .         .
18.80    5.3656     2.03  .Q        .         .         .         .
18.99    5.3962     1.94  Q         .         .         .         .
19.17    5.4255     1.87  Q         .         .         .         .
19.36    5.4538     1.80  Q         .         .         .         .
19.55    5.4810     1.73  Q         .         .         .         .
19.73    5.5073     1.68  Q         .         .         .         .
19.92    5.5328     1.62  Q         .         .         .         .
20.11    5.5575     1.58  Q         .         .         .         .
20.29    5.5814     1.53  Q         .         .         .         .
20.48    5.6047     1.49  Q         .         .         .         .
20.67    5.6274     1.45  Q         .         .         .         .
20.85    5.6495     1.41  Q         .         .         .         .
21.04    5.6711     1.38  Q         .         .         .         .
21.23    5.6921     1.35  Q         .         .         .         .
21.41    5.7127     1.32  Q         .         .         .         .
21.60    5.7328     1.29  Q         .         .         .         .
21.79    5.7525     1.26  Q         .         .         .         .
21.97    5.7717     1.24  Q         .         .         .         .
22.16    5.7906     1.21  Q         .         .         .         .
22.35    5.8092     1.19  Q         .         .         .         .
22.53    5.8274     1.17  Q         .         .         .         .
22.72    5.8452     1.15  Q         .         .         .         .
22.91    5.8628     1.13  Q         .         .         .         .
23.09    5.8800     1.11  Q         .         .         .         .
23.28    5.8969     1.09  Q         .         .         .         .
23.47    5.9136     1.07  Q         .         .         .         .
23.65    5.9300     1.06  Q         .         .         .         .
23.84    5.9462     1.04  Q         .         .         .         .
24.03    5.9621     1.02  Q         .         .         .         .
24.21    5.9700     0.00  Q         .         .         .         .
```

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----------------------------------------------------------------------------
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                Duration
       Peak Flow Rate                     (minutes)
   =======================                =========
             0%                            1444.8
            10%                              67.2
            20%                              22.4
            30%                              11.2
            40%                              11.2
            50%                              11.2
            60%                              11.2
            70%                              11.2
            80%                              11.2
            90%                              11.2

 Problem Descriptions:
  Gateway Hydrograph/ Detention Routing
  Proposed Condition (calibration coef: 0.8653)
  2-year storm event
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =   64.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.101
    LOW LOSS FRACTION = 0.433
    TIME OF CONCENTRATION(MIN.) = 11.20
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =    2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.97
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     5.07

****************************************************************************
  TIME     VOLUME        Q    0.        20.0      40.0      60.0      80.0
 (HOURS)    (AF)       (CFS)
----------------------------------------------------------------------------
  0.13     0.0056      1.01  Q         .         .         .         .
  0.32     0.0213      1.02  Q         .         .         .         .
  0.51     0.0371      1.03  Q         .         .         .         .
  0.69     0.0530      1.03  Q         .         .         .         .
  0.88     0.0690      1.04  Q         .         .         .         .
  1.07     0.0852      1.05  Q         .         .         .         .
  1.25     0.1015      1.06  Q         .         .         .         .
  1.44     0.1179      1.07  Q         .         .         .         .
  1.63     0.1344      1.08  Q         .         .         .         .
  1.81     0.1511      1.08  Q         .         .         .         .
  2.00     0.1679      1.10  Q         .         .         .         .
  2.19     0.1849      1.10  Q         .         .         .         .
  2.37     0.2019      1.11  Q         .         .         .         .
  2.56     0.2192      1.12  Q         .         .         .         .
  2.75     0.2366      1.13  Q         .         .         .         .
  2.93     0.2541      1.14  Q         .         .         .         .
  3.12     0.2718      1.15  Q         .         .         .         .
  3.31     0.2897      1.16  Q         .         .         .         .
```

```
  3.49     0.3077       1.18 Q         .         .         .         .
  3.68     0.3259       1.18 Q         .         .         .         .
  3.87     0.3442       1.20 Q         .         .         .         .
  4.05     0.3628       1.20 Q         .         .         .         .
  4.24     0.3815       1.22 Q         .         .         .         .
  4.43     0.4004       1.23 Q         .         .         .         .
  4.61     0.4194       1.25 Q         .         .         .         .
  4.80     0.4387       1.25 Q         .         .         .         .
  4.99     0.4582       1.27 Q         .         .         .         .
  5.17     0.4779       1.28 Q         .         .         .         .
  5.36     0.4978       1.30 Q         .         .         .         .
  5.55     0.5179       1.31 Q         .         .         .         .
  5.73     0.5382       1.33 Q         .         .         .         .
  5.92     0.5588       1.34 Q         .         .         .         .
  6.11     0.5796       1.36 Q         .         .         .         .
  6.29     0.6006       1.37 Q         .         .         .         .
  6.48     0.6219       1.39 Q         .         .         .         .
  6.67     0.6435       1.40 Q         .         .         .         .
  6.85     0.6653       1.43 Q         .         .         .         .
  7.04     0.6874       1.44 Q         .         .         .         .
  7.23     0.7097       1.46 Q         .         .         .         .
  7.41     0.7324       1.48 Q         .         .         .         .
  7.60     0.7554       1.50 Q         .         .         .         .
  7.79     0.7787       1.52 Q         .         .         .         .
  7.97     0.8023       1.55 Q         .         .         .         .
  8.16     0.8263       1.56 Q         .         .         .         .
  8.35     0.8506       1.59 Q         .         .         .         .
  8.53     0.8752       1.61 Q         .         .         .         .
  8.72     0.9003       1.64 Q         .         .         .         .
  8.91     0.9258       1.66 Q         .         .         .         .
  9.09     0.9516       1.70 Q         .         .         .         .
  9.28     0.9779       1.71 Q         .         .         .         .
  9.47     1.0047       1.75 Q         .         .         .         .
  9.65     1.0319       1.77 Q         .         .         .         .
  9.84     1.0596       1.82 Q         .         .         .         .
 10.03     1.0879       1.84 Q         .         .         .         .
 10.21     1.1166       1.89 Q         .         .         .         .
 10.40     1.1460       1.92 Q         .         .         .         .
 10.59     1.1759       1.97 Q         .         .         .         .
 10.77     1.2065       2.00 Q         .         .         .         .
 10.96     1.2378       2.06 .Q        .         .         .         .
 11.15     1.2698       2.09 .Q        .         .         .         .
 11.33     1.3025       2.16 .Q        .         .         .         .
 11.52     1.3360       2.19 .Q        .         .         .         .
 11.71     1.3704       2.27 .Q        .         .         .         .
 11.89     1.4057       2.31 .Q        .         .         .         .
 12.08     1.4426       2.47 .Q        .         .         .         .
 12.27     1.4845       2.96 .Q        .         .         .         .
 12.45     1.5310       3.07 .Q        .         .         .         .
 12.64     1.5789       3.13 .Q        .         .         .         .
 12.83     1.6282       3.26 .Q        .         .         .         .
 13.01     1.6790       3.33 .Q        .         .         .         .
 13.20     1.7315       3.48 .Q        .         .         .         .
 13.39     1.7858       3.56 .Q        .         .         .         .
 13.57     1.8421       3.75 .Q        .         .         .         .
 13.76     1.9007       3.85 .Q        .         .         .         .
 13.95     1.9620       4.08 . Q       .         .         .         .
 14.13     2.0261       4.23 . Q       .         .         .         .
 14.32     2.0948       4.68 . Q       .         .         .         .
 14.51     2.1685       4.87 . Q       .         .         .         .
 14.69     2.2469       5.30 . Q       .         .         .         .
 14.88     2.3306       5.56 . Q       .         .         .         .
 15.07     2.4214       6.21 .  Q      .         .         .         .
 15.25     2.5205       6.64 .  Q      .         .         .         .
 15.44     2.6292       7.46 .  Q      .         .         .         .
 15.63     2.7463       7.72 .  Q      .         .         .         .
 15.81     2.9114      13.69 .     Q   .         .         .         .
 16.00     3.1782      20.90 .         Q         .         .         .
 16.19     3.9094      73.90 .         .         .         .     Q   .
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```
 16.37      4.5558      9.89  .   Q     .         .         .         .
 16.56      4.6873      7.16  .  Q      .         .         .         .
 16.75      4.7877      5.86  . Q       .         .         .         .
 16.93      4.8720      5.07  . Q       .         .         .         .
 17.12      4.9460      4.52  . Q       .         .         .         .
 17.31      5.0114      3.96  .Q        .         .         .         .
 17.49      5.0702      3.65  .Q        .         .         .         .
 17.68      5.1246      3.40  .Q        .         .         .         .
 17.87      5.1754      3.19  .Q        .         .         .         .
 18.05      5.2233      3.02  .Q        .         .         .         .
 18.24      5.2647      2.35  .Q        .         .         .         .
 18.43      5.3001      2.23  .Q        .         .         .         .
 18.61      5.3336      2.12  .Q        .         .         .         .
 18.80      5.3656      2.03  .Q        .         .         .         .
 18.99      5.3962      1.94  Q         .         .         .         .
 19.17      5.4255      1.87  Q         .         .         .         .
 19.36      5.4538      1.80  Q         .         .         .         .
 19.55      5.4810      1.73  Q         .         .         .         .
 19.73      5.5073      1.68  Q         .         .         .         .
 19.92      5.5328      1.62  Q         .         .         .         .
 20.11      5.5575      1.58  Q         .         .         .         .
 20.29      5.5814      1.53  Q         .         .         .         .
 20.48      5.6047      1.49  Q         .         .         .         .
 20.67      5.6274      1.45  Q         .         .         .         .
 20.85      5.6495      1.41  Q         .         .         .         .
 21.04      5.6711      1.38  Q         .         .         .         .
 21.23      5.6921      1.35  Q         .         .         .         .
 21.41      5.7127      1.32  Q         .         .         .         .
 21.60      5.7328      1.29  Q         .         .         .         .
 21.79      5.7525      1.26  Q         .         .         .         .
 21.97      5.7717      1.24  Q         .         .         .         .
 22.16      5.7906      1.21  Q         .         .         .         .
 22.35      5.8092      1.19  Q         .         .         .         .
 22.53      5.8274      1.17  Q         .         .         .         .
 22.72      5.8452      1.15  Q         .         .         .         .
 22.91      5.8628      1.13  Q         .         .         .         .
 23.09      5.8800      1.11  Q         .         .         .         .
 23.28      5.8969      1.09  Q         .         .         .         .
 23.47      5.9136      1.07  Q         .         .         .         .
 23.65      5.9300      1.06  Q         .         .         .         .
 23.84      5.9462      1.04  Q         .         .         .         .
 24.03      5.9621      1.02  Q         .         .         .         .
 24.21      5.9700      0.00  Q         .         .         .         .
----------------------------------------------------------------------------
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                Duration
       Peak Flow Rate                     (minutes)
   =======================                =========
              0%                           1444.8
             10%                             67.2
             20%                             22.4
             30%                             11.2
             40%                             11.2
             50%                             11.2
             60%                             11.2
             70%                             11.2
             80%                             11.2
             90%                             11.2

 Problem Descriptions:
  Gateway Hydrograph/ Detention Routing
  Proposed Condition (calibration coef: 0.8653)
  2-year storm event
----------------------------------------------------------------------------
```

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
TOTAL CATCHMENT AREA(ACRES) = 64.60
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.101
LOW LOSS FRACTION = 0.433
TIME OF CONCENTRATION(MIN.) = 11.20
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.19
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.53
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.89
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.22
24-HOUR POINT RAINFALL VALUE(INCHES) = 2.05

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 5.97
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 5.07

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	20.0	40.0	60.0	80.0
0.13	0.0056	1.01	Q	.	.	.	.
0.32	0.0213	1.02	Q	.	.	.	.
0.51	0.0371	1.03	Q	.	.	.	.
0.69	0.0530	1.03	Q	.	.	.	.
0.88	0.0690	1.04	Q	.	.	.	.
1.07	0.0852	1.05	Q	.	.	.	.
1.25	0.1015	1.06	Q	.	.	.	.
1.44	0.1179	1.07	Q	.	.	.	.
1.63	0.1344	1.08	Q	.	.	.	.
1.81	0.1511	1.08	Q	.	.	.	.
2.00	0.1679	1.10	Q	.	.	.	.
2.19	0.1849	1.10	Q	.	.	.	.
2.37	0.2019	1.11	Q	.	.	.	.
2.56	0.2192	1.12	Q	.	.	.	.
2.75	0.2366	1.13	Q	.	.	.	.
2.93	0.2541	1.14	Q	.	.	.	.
3.12	0.2718	1.15	Q	.	.	.	.
3.31	0.2897	1.16	Q	.	.	.	.
3.49	0.3077	1.18	Q	.	.	.	.
3.68	0.3259	1.18	Q	.	.	.	.
3.87	0.3442	1.20	Q	.	.	.	.
4.05	0.3628	1.20	Q	.	.	.	.
4.24	0.3815	1.22	Q	.	.	.	.
4.43	0.4004	1.23	Q	.	.	.	.
4.61	0.4194	1.25	Q	.	.	.	.
4.80	0.4387	1.25	Q	.	.	.	.
4.99	0.4582	1.27	Q	.	.	.	.
5.17	0.4779	1.28	Q	.	.	.	.
5.36	0.4978	1.30	Q	.	.	.	.
5.55	0.5179	1.31	Q	.	.	.	.
5.73	0.5382	1.33	Q	.	.	.	.
5.92	0.5588	1.34	Q	.	.	.	.
6.11	0.5796	1.36	Q	.	.	.	.
6.29	0.6006	1.37	Q	.	.	.	.
6.48	0.6219	1.39	Q	.	.	.	.
6.67	0.6435	1.40	Q	.	.	.	.
6.85	0.6653	1.43	Q	.	.	.	.
7.04	0.6874	1.44	Q	.	.	.	.
7.23	0.7097	1.46	Q	.	.	.	.
7.41	0.7324	1.48	Q	.	.	.	.
7.60	0.7554	1.50	Q	.	.	.	.
7.79	0.7787	1.52	Q	.	.	.	.
7.97	0.8023	1.55	Q	.	.	.	.
8.16	0.8263	1.56	Q	.	.	.	.

```
 8.35      0.8506      1.59  Q         .         .         .         .
 8.53      0.8752      1.61  Q         .         .         .         .
 8.72      0.9003      1.64  Q         .         .         .         .
 8.91      0.9258      1.66  Q         .         .         .         .
 9.09      0.9516      1.70  Q         .         .         .         .
 9.28      0.9779      1.71  Q         .         .         .         .
 9.47      1.0047      1.75  Q         .         .         .         .
 9.65      1.0319      1.77  Q         .         .         .         .
 9.84      1.0596      1.82  Q         .         .         .         .
10.03      1.0879      1.84  Q         .         .         .         .
10.21      1.1166      1.89  Q         .         .         .         .
10.40      1.1460      1.92  Q         .         .         .         .
10.59      1.1759      1.97  Q         .         .         .         .
10.77      1.2065      2.00  Q         .         .         .         .
10.96      1.2378      2.06  .Q        .         .         .         .
11.15      1.2698      2.09  .Q        .         .         .         .
11.33      1.3025      2.16  .Q        .         .         .         .
11.52      1.3360      2.19  .Q        .         .         .         .
11.71      1.3704      2.27  .Q        .         .         .         .
11.89      1.4057      2.31  .Q        .         .         .         .
12.08      1.4426      2.47  .Q        .         .         .         .
12.27      1.4845      2.96  .Q        .         .         .         .
12.45      1.5310      3.07  .Q        .         .         .         .
12.64      1.5789      3.13  .Q        .         .         .         .
12.83      1.6282      3.26  .Q        .         .         .         .
13.01      1.6790      3.33  .Q        .         .         .         .
13.20      1.7315      3.48  .Q        .         .         .         .
13.39      1.7858      3.56  .Q        .         .         .         .
13.57      1.8421      3.75  .Q        .         .         .         .
13.76      1.9007      3.85  .Q        .         .         .         .
13.95      1.9620      4.08  . Q       .         .         .         .
14.13      2.0261      4.23  . Q       .         .         .         .
14.32      2.0948      4.68  . Q       .         .         .         .
14.51      2.1685      4.87  . Q       .         .         .         .
14.69      2.2469      5.30  . Q       .         .         .         .
14.88      2.3306      5.56  . Q       .         .         .         .
15.07      2.4214      6.21  .  Q      .         .         .         .
15.25      2.5205      6.64  .  Q      .         .         .         .
15.44      2.6292      7.46  .  Q      .         .         .         .
15.63      2.7463      7.72  .  Q      .         .         .         .
15.81      2.9114     13.69  .     Q   .         .         .         .
16.00      3.1782     20.90  .         Q         .         .         .
16.19      3.9094     73.90  .         .         .         .     Q   .
16.37      4.5558      9.89  .   Q     .         .         .         .
16.56      4.6873      7.16  .  Q      .         .         .         .
16.75      4.7877      5.86  . Q       .         .         .         .
16.93      4.8720      5.07  . Q       .         .         .         .
17.12      4.9460      4.52  . Q       .         .         .         .
17.31      5.0114      3.96  .Q        .         .         .         .
17.49      5.0702      3.65  .Q        .         .         .         .
17.68      5.1246      3.40  .Q        .         .         .         .
17.87      5.1754      3.19  .Q        .         .         .         .
18.05      5.2233      3.02  .Q        .         .         .         .
18.24      5.2647      2.35  .Q        .         .         .         .
18.43      5.3001      2.23  .Q        .         .         .         .
18.61      5.3336      2.12  .Q        .         .         .         .
18.80      5.3656      2.03  .Q        .         .         .         .
18.99      5.3962      1.94  Q         .         .         .         .
19.17      5.4255      1.87  Q         .         .         .         .
19.36      5.4538      1.80  Q         .         .         .         .
19.55      5.4810      1.73  Q         .         .         .         .
19.73      5.5073      1.68  Q         .         .         .         .
19.92      5.5328      1.62  Q         .         .         .         .
20.11      5.5575      1.58  Q         .         .         .         .
20.29      5.5814      1.53  Q         .         .         .         .
20.48      5.6047      1.49  Q         .         .         .         .
20.67      5.6274      1.45  Q         .         .         .         .
20.85      5.6495      1.41  Q         .         .         .         .
21.04      5.6711      1.38  Q         .         .         .         .
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 21.23      5.6921      1.35  Q         .         .         .         .
 21.41      5.7127      1.32  Q         .         .         .         .
 21.60      5.7328      1.29  Q         .         .         .         .
 21.79      5.7525      1.26  Q         .         .         .         .
 21.97      5.7717      1.24  Q         .         .         .         .
 22.16      5.7906      1.21  Q         .         .         .         .
 22.35      5.8092      1.19  Q         .         .         .         .
 22.53      5.8274      1.17  Q         .         .         .         .
 22.72      5.8452      1.15  Q         .         .         .         .
 22.91      5.8628      1.13  Q         .         .         .         .
 23.09      5.8800      1.11  Q         .         .         .         .
 23.28      5.8969      1.09  Q         .         .         .         .
 23.47      5.9136      1.07  Q         .         .         .         .
 23.65      5.9300      1.06  Q         .         .         .         .
 23.84      5.9462      1.04  Q         .         .         .         .
 24.03      5.9621      1.02  Q         .         .         .         .
 24.21      5.9700      0.00  Q         .         .         .         .
-----------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                Duration
        Peak Flow Rate                     (minutes)
    =======================                =========
              0%                            1444.8
             10%                              67.2
             20%                              22.4
             30%                              11.2
             40%                              11.2
             50%                              11.2
             60%                              11.2
             70%                              11.2
             80%                              11.2
             90%                              11.2

  Problem Descriptions:
   Gateway Hydrograph/ Detention Routing
   Proposed Condition (calibration coef: 0.8653)
   2-year storm event


****************************************************************************
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   11.200
     DEAD STORAGE(AF) =        0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =        0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.40


                      INFLOW
                        |
                        |
                        |
                        V              __effective depth
                 -------------          |    (and volume)
                 |           |    |     |
                 | detention |    |....V.............
                 |   basin   |<-->|         outflow
                 |           |    |.........________
                 -------------    |         |   \
                        |         | storage |    basin outlet
                        V         -----------
                     OUTFLOW
```

150' x 150' footprint
(7' depth)

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 13

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)
0.000	0.000	0.000	0.250	0.130	1.000
0.500	0.260	2.000	0.750	0.390	3.000
1.000	0.520	4.000	1.250	0.650	5.000
1.500	0.770	10.400	1.750	0.900	14.600
2.000	1.030	17.900	2.250	1.160	20.700
2.500	1.290	23.100	3.000	1.550	27.400
3.500	1.810	31.000			

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	0.12229	0.13771
3	0.50	0.24457	0.27543
4	0.75	0.36686	0.41314
5	1.00	0.48915	0.55085
6	1.25	0.61143	0.68857
7	1.50	0.68978	0.85022
8	1.75	0.78738	1.01262
9	2.00	0.89193	1.16807
10	2.25	1.00033	1.31967
11	2.50	1.11182	1.46818
12	3.00	1.33865	1.76135
13	3.50	1.57088	2.04912

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.133	0.000	1.01	0.38	1.57	0.199
0.320	0.000	1.02	0.37	1.51	0.192
0.507	0.000	1.03	0.36	1.45	0.185
0.693	0.000	1.03	0.35	1.40	0.180
0.880	0.000	1.04	0.34	1.36	0.175
1.067	0.000	1.05	0.33	1.33	0.171
1.253	0.000	1.06	0.32	1.30	0.167
1.440	0.000	1.07	0.31	1.27	0.164
1.627	0.000	1.08	0.31	1.25	0.161
1.813	0.000	1.08	0.31	1.23	0.159
2.000	0.000	1.10	0.30	1.21	0.157
2.187	0.000	1.10	0.30	1.20	0.155
2.373	0.000	1.11	0.30	1.19	0.154
2.560	0.000	1.12	0.29	1.18	0.153
2.747	0.000	1.13	0.29	1.18	0.153
2.933	0.000	1.14	0.29	1.17	0.152
3.120	0.000	1.15	0.29	1.17	0.152
3.307	0.000	1.16	0.29	1.17	0.152
3.493	0.000	1.18	0.29	1.17	0.152
3.680	0.000	1.18	0.29	1.17	0.152
3.867	0.000	1.20	0.29	1.17	0.152
4.053	0.000	1.20	0.29	1.17	0.153
4.240	0.000	1.22	0.30	1.18	0.154
4.427	0.000	1.23	0.30	1.18	0.154
4.613	0.000	1.25	0.30	1.19	0.155
4.800	0.000	1.25	0.30	1.20	0.156
4.987	0.000	1.27	0.30	1.20	0.157
5.173	0.000	1.28	0.30	1.21	0.158
5.360	0.000	1.30	0.31	1.22	0.159
5.547	0.000	1.31	0.31	1.23	0.161

5.733	0.000	1.33	0.31	1.24	0.162
5.920	0.000	1.34	0.31	1.25	0.163
6.107	0.000	1.36	0.32	1.26	0.165
6.293	0.000	1.37	0.32	1.27	0.166
6.480	0.000	1.39	0.32	1.28	0.168
6.667	0.000	1.40	0.33	1.30	0.169
6.853	0.000	1.43	0.33	1.31	0.171
7.040	0.000	1.44	0.33	1.32	0.173
7.227	0.000	1.46	0.34	1.34	0.175
7.413	0.000	1.48	0.34	1.35	0.177
7.600	0.000	1.50	0.34	1.37	0.179
7.787	0.000	1.52	0.35	1.38	0.181
7.973	0.000	1.55	0.35	1.40	0.183
8.160	0.000	1.56	0.36	1.42	0.185
8.347	0.000	1.59	0.36	1.44	0.188
8.533	0.000	1.61	0.37	1.45	0.190
8.720	0.000	1.64	0.37	1.47	0.193
8.907	0.000	1.66	0.38	1.49	0.195
9.093	0.000	1.70	0.38	1.51	0.198
9.280	0.000	1.71	0.39	1.53	0.201
9.467	0.000	1.75	0.39	1.56	0.204
9.653	0.000	1.77	0.40	1.58	0.207
9.840	0.000	1.82	0.40	1.60	0.210
10.027	0.000	1.84	0.41	1.63	0.214
10.213	0.000	1.89	0.42	1.66	0.217
10.400	0.000	1.92	0.42	1.68	0.221
10.587	0.000	1.97	0.43	1.71	0.225
10.773	0.000	2.00	0.44	1.74	0.229
10.960	0.000	2.06	0.45	1.77	0.233
11.147	0.000	2.09	0.46	1.81	0.237
11.333	0.000	2.16	0.47	1.84	0.242
11.520	0.000	2.19	0.47	1.88	0.247
11.707	0.000	2.27	0.48	1.92	0.252
11.893	0.000	2.31	0.50	1.96	0.258
12.080	0.000	2.47	0.51	2.01	0.265
12.267	0.000	2.96	0.53	2.09	0.278
12.453	0.000	3.07	0.56	2.19	0.292
12.640	0.000	3.13	0.59	2.29	0.305
12.827	0.000	3.26	0.61	2.39	0.318
13.013	0.000	3.33	0.64	2.50	0.331
13.200	0.000	3.48	0.66	2.60	0.344
13.387	0.000	3.56	0.69	2.70	0.358
13.573	0.000	3.75	0.72	2.81	0.372
13.760	0.000	3.85	0.74	2.92	0.387
13.947	0.000	4.08	0.77	3.04	0.403
14.133	0.000	4.23	0.81	3.16	0.419
14.320	0.000	4.68	0.85	3.31	0.440
14.507	0.000	4.87	0.89	3.47	0.462
14.693	0.000	5.30	0.94	3.65	0.487
14.880	0.000	5.56	0.99	3.85	0.514
15.067	0.000	6.21	1.05	4.08	0.547
15.253	0.000	6.64	1.12	4.34	0.582
15.440	0.000	7.46	1.20	4.64	0.625
15.627	0.000	7.72	1.28	5.22	0.664
15.813	0.000	13.69	1.47	7.71	0.756
16.000	0.000	20.90	1.74	12.07	0.893
16.187	0.000	73.90	3.28	21.88	1.695
16.373	0.000	9.89	2.76	27.37	1.425
16.560	0.000	7.16	2.28	23.19	1.178
16.747	0.000	5.86	1.90	18.81	0.978
16.933	0.000	5.07	1.62	14.51	0.833
17.120	0.000	4.52	1.43	10.68	0.738
17.307	0.000	3.96	1.31	7.66	0.681
17.493	0.000	3.65	1.25	5.69	0.649
17.680	0.000	3.40	1.20	4.90	0.626
17.867	0.000	3.19	1.16	4.72	0.602
18.053	0.000	3.02	1.11	4.54	0.579
18.240	0.000	2.35	1.05	4.33	0.548
18.427	0.000	2.23	1.00	4.11	0.519

Inflow
Depth
Outflow

18.613	0.000	2.12	0.95	3.89	0.492
18.800	0.000	2.03	0.90	3.69	0.466
18.987	0.000	1.94	0.85	3.50	0.442
19.173	0.000	1.87	0.81	3.32	0.420
19.360	0.000	1.80	0.77	3.15	0.399
19.547	0.000	1.73	0.73	3.00	0.380
19.733	0.000	1.68	0.70	2.85	0.362
19.920	0.000	1.62	0.66	2.72	0.345
20.107	0.000	1.58	0.63	2.59	0.329
20.293	0.000	1.53	0.60	2.48	0.314
20.480	0.000	1.49	0.58	2.37	0.301
20.667	0.000	1.45	0.55	2.27	0.288
20.853	0.000	1.41	0.53	2.17	0.277
21.040	0.000	1.38	0.51	2.09	0.266
21.227	0.000	1.35	0.49	2.01	0.256
21.413	0.000	1.32	0.47	1.93	0.246
21.600	0.000	1.29	0.46	1.86	0.237
21.787	0.000	1.26	0.44	1.79	0.229
21.973	0.000	1.24	0.43	1.73	0.222
22.160	0.000	1.21	0.41	1.68	0.214
22.347	0.000	1.19	0.40	1.62	0.208
22.533	0.000	1.17	0.39	1.57	0.201
22.720	0.000	1.15	0.38	1.53	0.196
22.907	0.000	1.13	0.37	1.48	0.190
23.093	0.000	1.11	0.36	1.44	0.185
23.280	0.000	1.09	0.35	1.40	0.180
23.467	0.000	1.07	0.34	1.37	0.176
23.653	0.000	1.06	0.33	1.33	0.171
23.840	0.000	1.04	0.32	1.30	0.167
24.027	0.000	1.02	0.31	1.27	0.163
24.213	0.000	0.00	0.28	1.19	0.145
24.400	0.000	0.00	0.25	1.05	0.129
24.587	0.000	0.00	0.22	0.94	0.114
24.773	0.000	0.00	0.20	0.83	0.102
24.960	0.000	0.00	0.17	0.74	0.090
25.147	0.000	0.00	0.15	0.65	0.080
25.333	0.000	0.00	0.14	0.58	0.071
25.520	0.000	0.00	0.12	0.52	0.063
25.707	0.000	0.00	0.11	0.46	0.056
25.893	0.000	0.00	0.10	0.41	0.050
26.080	0.000	0.00	0.09	0.36	0.044
26.267	0.000	0.00	0.08	0.32	0.039
26.453	0.000	0.00	0.07	0.29	0.035
26.640	0.000	0.00	0.06	0.25	0.031
26.827	0.000	0.00	0.05	0.22	0.027
27.013	0.000	0.00	0.05	0.20	0.024
27.200	0.000	0.00	0.04	0.18	0.022
27.387	0.000	0.00	0.04	0.16	0.019
27.573	0.000	0.00	0.03	0.14	0.017
27.760	0.000	0.00	0.03	0.12	0.015
27.947	0.000	0.00	0.03	0.11	0.013
28.133	0.000	0.00	0.02	0.10	0.012
28.320	0.000	0.00	0.02	0.09	0.011
28.507	0.000	0.00	0.02	0.08	0.009
28.693	0.000	0.00	0.02	0.07	0.008
28.880	0.000	0.00	0.01	0.06	0.007
29.067	0.000	0.00	0.01	0.05	0.007
29.253	0.000	0.00	0.01	0.05	0.006
29.440	0.000	0.00	0.01	0.04	0.005
29.627	0.000	0.00	0.01	0.04	0.005
29.813	0.000	0.00	0.01	0.03	0.004
30.000	0.000	0.00	0.01	0.03	0.004
30.187	0.000	0.00	0.01	0.03	0.003
30.373	0.000	0.00	0.01	0.02	0.003
30.560	0.000	0.00	0.00	0.02	0.003
30.747	0.000	0.00	0.00	0.02	0.002
30.933	0.000	0.00	0.00	0.02	0.002
31.120	0.000	0.00	0.00	0.01	0.002
31.307	0.000	0.00	0.00	0.01	0.002

31.493	0.000	0.00	0.00	0.01	0.001
31.680	0.000	0.00	0.00	0.01	0.001
31.867	0.000	0.00	0.00	0.01	0.001
32.053	0.000	0.00	0.00	0.01	0.001

```
****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                         Analysis prepared by:




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----------------------------------------------------------------------------

 Problem Descriptions:
  Gateway Hydrograph
  Proposed Condition
  25-year storm event
============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.49 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE       (Acres)   PERVIOUS AREA    NUMBER    Fp(in./hr.)    YIELD
        1           6.90       35.00           32.        0.400       0.616
        2          11.10       35.00           56.        0.300       0.677
        3          33.60       35.00           69.        0.250       0.740
        4           1.70       10.00           32.        0.400       0.853
        5           1.00       10.00           56.        0.300       0.870
        6           5.30       10.00           69.        0.250       0.888
        7           3.60      100.00           80.        0.250       0.546
        8           1.40       85.00           69.        0.250       0.444

    TOTAL AREA (Acres) =     64.60
                              _
    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.101
                                      _
    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.284
============================================================================

 Problem Descriptions:
  Gateway Hydrograph
  Proposed Condition (calibration coefficient: 0.86165)
  25-year storm event
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.86
    TOTAL CATCHMENT AREA(ACRES) =   64.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.101
    LOW LOSS FRACTION = 0.284
    TIME OF CONCENTRATION(MIN.) = 10.20
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------
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WATERSHED 'E'

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****************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:




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----------------------------------------------------------------------------

 Problem Descriptions:
  Gateway Flood Hydrograph Routing             WATERSHED 'E'
  Proposed Condition (calib coef: 0.86165)
  25-year storm event
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.86
    TOTAL CATCHMENT AREA(ACRES) =   64.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.101
    LOW LOSS FRACTION = 0.284
    TIME OF CONCENTRATION(MIN.) = 10.20
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    15.98
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     8.19

****************************************************************************
  TIME     VOLUME       Q    0.        45.0      90.0     135.0     180.0
 (HOURS)    (AF)       (CFS)
----------------------------------------------------------------------------
  0.02      0.0000      0.00  Q         .         .         .         .
  0.19      0.0191      2.72  Q         .         .         .         .
  0.36      0.0575      2.74  Q         .         .         .         .
  0.53      0.0961      2.76  Q         .         .         .         .
  0.70      0.1350      2.77  Q         .         .         .         .
  0.87      0.1742      2.80  Q         .         .         .         .
  1.04      0.2136      2.81  Q         .         .         .         .
  1.21      0.2533      2.84  Q         .         .         .         .
  1.38      0.2933      2.85  Q         .         .         .         .
  1.55      0.3336      2.88  Q         .         .         .         .
  1.72      0.3743      2.90  Q         .         .         .         .
  1.89      0.4152      2.93  Q         .         .         .         .
  2.06      0.4564      2.94  Q         .         .         .         .
  2.23      0.4979      2.97  Q         .         .         .         .
  2.40      0.5398      2.99  Q         .         .         .         .
  2.57      0.5820      3.02  Q         .         .         .         .
  2.74      0.6245      3.04  Q         .         .         .         .
  2.91      0.6674      3.07  Q         .         .         .         .
  3.08      0.7106      3.09  Q         .         .         .         .
  3.25      0.7542      3.12  Q         .         .         .         .
  3.42      0.7982      3.14  Q         .         .         .         .
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  3.59     0.8425     3.17  Q         .         .         .         .
  3.76     0.8872     3.19  Q         .         .         .         .
  3.93     0.9323     3.23  Q         .         .         .         .
  4.10     0.9778     3.25  Q         .         .         .         .
  4.27     1.0237     3.29  Q         .         .         .         .
  4.44     1.0701     3.31  Q         .         .         .         .
  4.61     1.1168     3.35  Q         .         .         .         .
  4.78     1.1640     3.37  Q         .         .         .         .
  4.95     1.2117     3.41  Q         .         .         .         .
  5.12     1.2598     3.44  Q         .         .         .         .
  5.29     1.3084     3.48  Q         .         .         .         .
  5.46     1.3575     3.51  Q         .         .         .         .
  5.63     1.4071     3.55  Q         .         .         .         .
  5.80     1.4572     3.58  Q         .         .         .         .
  5.97     1.5078     3.63  Q         .         .         .         .
  6.14     1.5590     3.65  Q         .         .         .         .
  6.31     1.6107     3.71  Q         .         .         .         .
  6.48     1.6630     3.74  Q         .         .         .         .
  6.65     1.7159     3.79  Q         .         .         .         .
  6.82     1.7693     3.82  Q         .         .         .         .
  6.99     1.8234     3.88  Q         .         .         .         .
  7.16     1.8782     3.91  Q         .         .         .         .
  7.33     1.9336     3.98  Q         .         .         .         .
  7.50     1.9897     4.01  Q         .         .         .         .
  7.67     2.0465     4.08  Q         .         .         .         .
  7.84     2.1040     4.11  Q         .         .         .         .
  8.01     2.1623     4.19  Q         .         .         .         .
  8.18     2.2214     4.22  Q         .         .         .         .
  8.35     2.2813     4.30  Q         .         .         .         .
  8.52     2.3420     4.34  Q         .         .         .         .
  8.69     2.4036     4.42  Q         .         .         .         .
  8.86     2.4660     4.47  Q         .         .         .         .
  9.03     2.5294     4.56  .Q        .         .         .         .
  9.20     2.5938     4.61  .Q        .         .         .         .
  9.37     2.6592     4.70  .Q        .         .         .         .
  9.54     2.7257     4.75  .Q        .         .         .         .
  9.71     2.7932     4.86  .Q        .         .         .         .
  9.88     2.8619     4.92  .Q        .         .         .         .
 10.05     2.9318     5.03  .Q        .         .         .         .
 10.22     3.0029     5.09  .Q        .         .         .         .
 10.39     3.0754     5.22  .Q        .         .         .         .
 10.56     3.1492     5.29  .Q        .         .         .         .
 10.73     3.2245     5.43  .Q        .         .         .         .
 10.90     3.3013     5.50  .Q        .         .         .         .
 11.07     3.3797     5.66  .Q        .         .         .         .
 11.24     3.4597     5.74  .Q        .         .         .         .
 11.41     3.5416     5.91  .Q        .         .         .         .
 11.58     3.6254     6.01  .Q        .         .         .         .
 11.75     3.7111     6.20  .Q        .         .         .         .
 11.92     3.7990     6.31  .Q        .         .         .         .
 12.09     3.8936     7.16  .Q        .         .         .         .
 12.26     4.0056     8.78  .Q        .         .         .         .
 12.43     4.1310     9.06  . Q       .         .         .         .
 12.60     4.2593     9.21  . Q       .         .         .         .
 12.77     4.3909     9.53  . Q       .         .         .         .
 12.94     4.5259     9.70  . Q       .         .         .         .
 13.11     4.6648    10.07  . Q       .         .         .         .
 13.28     4.8077    10.27  . Q       .         .         .         .
 13.45     4.9551    10.72  . Q       .         .         .         .
 13.62     5.1074    10.96  . Q       .         .         .         .
 13.79     5.2652    11.50  . Q       .         .         .         .
 13.96     5.4289    11.80  . Q       .         .         .         .
 14.13     5.5988    12.38  . Q       .         .         .         .
 14.30     5.7750    12.71  . Q       .         .         .         .
 14.47     5.9598    13.60  .  Q      .         .         .         .
 14.64     6.1545    14.12  .  Q      .         .         .         .
 14.81     6.3649    15.83  .  Q      .         .         .         .
 14.98     6.5946    16.88  .  Q      .         .         .         .
 15.15     6.8502    19.51  .   Q     .         .         .         .
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15.32      7.1364     21.22  .   Q     .         .         .         .
15.49      7.4385     21.79  .   Q     .         .         .         .
15.66      7.7649     24.68  .    Q    .         .         .         .
15.83      8.2230     40.53  .        Q.         .         .         .
16.00      8.9077     56.94  .         . Q       .         .         .
16.17     10.5217    172.80  .         .         .         .       Q .
16.34     11.9437     29.63  .     Q   .         .         .         .
16.51     12.3157     23.32  .    Q    .         .         .         .
16.68     12.6065     18.09  .   Q     .         .         .         .
16.85     12.8383     14.91  .  Q      .         .         .         .
17.02     13.0353     13.13  . Q       .         .         .         .
17.19     13.2128     12.13  . Q       .         .         .         .
17.36     13.3768     11.22  . Q       .         .         .         .
17.53     13.5293     10.49  . Q       .         .         .         .
17.70     13.6724      9.88  . Q       .         .         .         .
17.87     13.8075      9.36  . Q       .         .         .         .
18.04     13.9360      8.92  .Q        .         .         .         .
18.21     14.0437      6.42  .Q        .         .         .         .
18.38     14.1317      6.10  .Q        .         .         .         .
18.55     14.2155      5.83  .Q        .         .         .         .
18.72     14.2956      5.58  .Q        .         .         .         .
18.89     14.3724      5.36  .Q        .         .         .         .
19.06     14.4462      5.16  .Q        .         .         .         .
19.23     14.5174      4.97  .Q        .         .         .         .
19.40     14.5861      4.81  .Q        .         .         .         .
19.57     14.6526      4.65  .Q        .         .         .         .
19.74     14.7170      4.51  .Q        .         .         .         .
19.91     14.7795      4.38  Q         .         .         .         .
20.08     14.8402      4.26  Q         .         .         .         .
20.25     14.8993      4.15  Q         .         .         .         .
20.42     14.9568      4.04  Q         .         .         .         .
20.59     15.0129      3.94  Q         .         .         .         .
20.76     15.0677      3.85  Q         .         .         .         .
20.93     15.1212      3.76  Q         .         .         .         .
21.10     15.1735      3.68  Q         .         .         .         .
21.27     15.2246      3.60  Q         .         .         .         .
21.44     15.2747      3.53  Q         .         .         .         .
21.61     15.3238      3.46  Q         .         .         .         .
21.78     15.3719      3.39  Q         .         .         .         .
21.95     15.4191      3.33  Q         .         .         .         .
22.12     15.4655      3.27  Q         .         .         .         .
22.29     15.5110      3.21  Q         .         .         .         .
22.46     15.5557      3.16  Q         .         .         .         .
22.63     15.5997      3.10  Q         .         .         .         .
22.80     15.6429      3.05  Q         .         .         .         .
22.97     15.6854      3.00  Q         .         .         .         .
23.14     15.7273      2.96  Q         .         .         .         .
23.31     15.7685      2.91  Q         .         .         .         .
23.48     15.8091      2.87  Q         .         .         .         .
23.65     15.8492      2.83  Q         .         .         .         .
23.82     15.8886      2.79  Q         .         .         .         .
23.99     15.9275      2.75  Q         .         .         .         .
24.16     15.9659      2.72  Q         .         .         .         .
24.33     15.9850      0.00  Q         .         .         .         .
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TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1448.4
10%	102.0
20%	30.6
30%	20.4
40%	10.2
50%	10.2

60%	10.2
70%	10.2
80%	10.2
90%	10.2

Problem Descriptions:
Gateway Flood Hydrograph Routing
Proposed Condition (calib coef: 0.86165)
25-year storm event

==

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.200
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

```
              INFLOW
                |
                |
                |
                V               __effective depth
         -------------         |    (and volume)
         |           |     |   |
         | detention |     |....V............
         |   basin   |<-->|         outflow
         |           |     |.........__________
         -------------     |         |    \
                |          | storage |     basin outlet
                V          -----------
             OUTFLOW
```

150' x 150' footprint
(7' depth)

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 20

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS) *
* 0.000	0.000	0.000**	0.250	0.130	1.000*
* 0.500	0.260	2.000**	0.750	0.390	3.000*
* 1.000	0.520	4.000**	1.250	0.650	5.000*
* 1.500	0.770	10.400**	1.750	0.900	14.600*
* 2.000	1.030	17.900**	2.250	1.160	20.700*
* 2.500	1.290	23.100**	3.000	1.550	27.400*
* 3.500	1.810	31.000**	4.000	2.070	36.300*
* 4.500	2.320	41.800**	5.000	2.580	49.500*
* 5.500	2.840	55.900**	6.000	3.100	61.300*
* 6.500	3.360	66.100**	7.000	3.620	70.500*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	0.12298	0.13702
3	0.50	0.24595	0.27405
4	0.75	0.36893	0.41107
5	1.00	0.49190	0.54810
6	1.25	0.61488	0.68512
7	1.50	0.69694	0.84306
8	1.75	0.79744	1.00256
9	2.00	0.90426	1.15574
10	2.25	1.01459	1.30541
11	2.50	1.12773	1.45227
12	3.00	1.35752	1.74248
13	3.50	1.59223	2.02777

14	4.00	1.81500	2.32500
15	4.50	2.02636	2.61364
16	5.00	2.23227	2.92773
17	5.50	2.44731	3.23269
18	6.00	2.66938	3.53062
19	6.50	2.89566	3.82434
20	7.00	3.12475	4.11525

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.020	0.000	0.00	0.00	0.00	0.000
0.190	0.000	2.72	0.07	0.14	0.036
0.360	0.000	2.74	0.13	0.41	0.069
0.530	0.000	2.76	0.19	0.65	0.099
0.700	0.000	2.77	0.24	0.86	0.126
0.870	0.000	2.80	0.29	1.06	0.150
1.040	0.000	2.81	0.33	1.24	0.172
1.210	0.000	2.84	0.37	1.40	0.192
1.380	0.000	2.85	0.41	1.55	0.211
1.550	0.000	2.88	0.44	1.69	0.228
1.720	0.000	2.90	0.47	1.81	0.243
1.890	0.000	2.93	0.49	1.92	0.257
2.060	0.000	2.94	0.52	2.03	0.270
2.230	0.000	2.97	0.54	2.12	0.282
2.400	0.000	2.99	0.56	2.21	0.293
2.570	0.000	3.02	0.58	2.29	0.303
2.740	0.000	3.04	0.60	2.37	0.312
2.910	0.000	3.07	0.62	2.44	0.321
3.080	0.000	3.09	0.63	2.50	0.329
3.250	0.000	3.12	0.65	2.56	0.337
3.420	0.000	3.14	0.66	2.62	0.344
3.590	0.000	3.17	0.68	2.68	0.351
3.760	0.000	3.19	0.69	2.73	0.358
3.930	0.000	3.23	0.70	2.78	0.364
4.100	0.000	3.25	0.71	2.83	0.370
4.270	0.000	3.29	0.72	2.87	0.376
4.440	0.000	3.31	0.73	2.91	0.382
4.610	0.000	3.35	0.74	2.96	0.387
4.780	0.000	3.37	0.75	3.00	0.392
4.950	0.000	3.41	0.76	3.04	0.398
5.120	0.000	3.44	0.77	3.08	0.403
5.290	0.000	3.48	0.78	3.12	0.408
5.460	0.000	3.51	0.79	3.16	0.413
5.630	0.000	3.55	0.80	3.19	0.418
5.800	0.000	3.58	0.81	3.23	0.423
5.970	0.000	3.63	0.82	3.27	0.428
6.140	0.000	3.65	0.83	3.31	0.433
6.310	0.000	3.71	0.84	3.35	0.438
6.480	0.000	3.74	0.85	3.38	0.443
6.650	0.000	3.79	0.86	3.42	0.448
6.820	0.000	3.82	0.87	3.46	0.453
6.990	0.000	3.88	0.88	3.50	0.458
7.160	0.000	3.91	0.89	3.54	0.463
7.330	0.000	3.98	0.90	3.58	0.469
7.500	0.000	4.01	0.91	3.63	0.474
7.670	0.000	4.08	0.92	3.67	0.480
7.840	0.000	4.11	0.93	3.71	0.485
8.010	0.000	4.19	0.95	3.76	0.491
8.180	0.000	4.22	0.96	3.80	0.497
8.350	0.000	4.30	0.97	3.85	0.504
8.520	0.000	4.34	0.98	3.90	0.510
8.690	0.000	4.42	0.99	3.95	0.517

8.860	0.000	4.47	1.01	4.00	0.523	
9.030	0.000	4.56	1.02	4.05	0.530	
9.200	0.000	4.61	1.03	4.11	0.537	
9.370	0.000	4.70	1.05	4.16	0.545	
9.540	0.000	4.75	1.06	4.22	0.552	
9.710	0.000	4.86	1.08	4.28	0.561	
9.880	0.000	4.92	1.09	4.34	0.569	
10.050	0.000	5.03	1.11	4.41	0.577	
10.220	0.000	5.09	1.13	4.48	0.586	
10.390	0.000	5.22	1.15	4.55	0.596	
10.560	0.000	5.29	1.16	4.62	0.605	
10.730	0.000	5.43	1.18	4.69	0.615	
10.900	0.000	5.50	1.20	4.77	0.626	
11.070	0.000	5.66	1.22	4.86	0.637	
11.240	0.000	5.74	1.25	4.94	0.648	
11.410	0.000	5.91	1.27	5.18	0.658	
11.580	0.000	6.01	1.28	5.53	0.665	
11.750	0.000	6.20	1.29	5.81	0.671	
11.920	0.000	6.31	1.30	6.02	0.675	
12.090	0.000	7.16	1.32	6.36	0.686	
12.260	0.000	8.78	1.37	7.14	0.709	
12.430	0.000	9.06	1.40	7.99	0.724	
12.600	0.000	9.21	1.42	8.54	0.733	
12.770	0.000	9.53	1.44	8.94	0.742	
12.940	0.000	9.70	1.45	9.26	0.748	
13.110	0.000	10.07	1.47	9.56	0.755	
13.280	0.000	10.27	1.48	9.85	0.761	
13.450	0.000	10.72	1.50	10.16	0.769	
13.620	0.000	10.96	1.51	10.46	0.776	
13.790	0.000	11.50	1.53	10.75	0.786	
13.960	0.000	11.80	1.55	11.09	0.796	
14.130	0.000	12.38	1.58	11.46	0.809	
14.300	0.000	12.71	1.60	11.86	0.821	
14.470	0.000	13.60	1.63	12.34	0.839	Inflow
14.640	0.000	14.12	1.67	12.90	0.856	
14.810	0.000	15.83	1.72	13.67	0.886	
14.980	0.000	16.88	1.78	14.61	0.918	
15.150	0.000	19.51	1.89	15.73	0.971	Depth
15.320	0.000	21.22	2.00	17.14	1.029	
15.490	0.000	21.79	2.09	18.38	1.076	
15.660	0.000	24.68	2.22	19.66	1.147	Outflow
15.830	0.000	40.53	2.71	22.65	1.398	
16.000	0.000	56.94	3.49	27.92	1.806	
16.170	0.000	$\boxed{172.80}$	$\boxed{6.83}$	49.97	3.532	
16.340	0.000	29.63	5.89	$\boxed{64.54}$	3.041	
16.510	0.000	23.32	5.03	54.99	2.596	
16.680	0.000	18.09	4.30	44.76	2.221	
16.850	0.000	14.91	3.71	36.43	1.919	
17.020	0.000	13.13	3.22	31.12	1.666	
17.190	0.000	12.13	2.81	27.39	1.452	
17.360	0.000	11.22	2.46	24.24	1.269	
17.530	0.000	10.49	2.17	21.25	1.118	
17.700	0.000	9.88	1.94	18.43	0.998	
17.870	0.000	9.36	1.76	15.91	0.906	
18.040	0.000	8.92	1.63	13.68	0.839	
18.210	0.000	6.42	1.50	11.46	0.768	
18.380	0.000	6.10	1.40	9.29	0.723	
18.550	0.000	5.83	1.35	7.69	0.697	
18.720	0.000	5.58	1.31	6.74	0.680	
18.890	0.000	5.36	1.29	6.13	0.670	
19.060	0.000	5.16	1.27	5.71	0.662	
19.230	0.000	4.97	1.26	5.40	0.656	
19.400	0.000	4.81	1.25	5.16	0.651	
19.570	0.000	4.65	1.24	5.01	0.646	
19.740	0.000	4.51	1.23	4.95	0.640	
19.910	0.000	4.38	1.22	4.90	0.633	
20.080	0.000	4.26	1.20	4.84	0.625	
20.250	0.000	4.15	1.18	4.77	0.616	
20.420	0.000	4.04	1.17	4.70	0.607	

20.590	0.000	3.94	1.15	4.63	0.597
20.760	0.000	3.85	1.13	4.55	0.587
20.930	0.000	3.76	1.11	4.48	0.577
21.100	0.000	3.68	1.09	4.40	0.567
21.270	0.000	3.60	1.07	4.32	0.557
21.440	0.000	3.53	1.05	4.25	0.547
21.610	0.000	3.46	1.03	4.17	0.537
21.780	0.000	3.39	1.01	4.09	0.527
21.950	0.000	3.33	0.99	4.02	0.517
22.120	0.000	3.27	0.98	3.94	0.508
22.290	0.000	3.21	0.96	3.87	0.499
22.460	0.000	3.16	0.94	3.80	0.490
22.630	0.000	3.10	0.92	3.73	0.481
22.800	0.000	3.05	0.91	3.66	0.472
22.970	0.000	3.00	0.89	3.60	0.464
23.140	0.000	2.96	0.88	3.54	0.456
23.310	0.000	2.91	0.86	3.47	0.448
23.480	0.000	2.87	0.85	3.41	0.440
23.650	0.000	2.83	0.83	3.36	0.433
23.820	0.000	2.79	0.82	3.30	0.425
23.990	0.000	2.75	0.80	3.25	0.418
24.160	0.000	2.72	0.79	3.19	0.412
24.330	0.000	0.00	0.71	3.00	0.370
24.500	0.000	0.00	0.64	2.70	0.332
24.670	0.000	0.00	0.57	2.42	0.298
24.840	0.000	0.00	0.51	2.17	0.267
25.010	0.000	0.00	0.46	1.95	0.240
25.180	0.000	0.00	0.41	1.75	0.215
25.350	0.000	0.00	0.37	1.57	0.193
25.520	0.000	0.00	0.33	1.41	0.173
25.690	0.000	0.00	0.30	1.26	0.156
25.860	0.000	0.00	0.27	1.13	0.140
26.030	0.000	0.00	0.24	1.02	0.125
26.200	0.000	0.00	0.22	0.91	0.112
26.370	0.000	0.00	0.19	0.82	0.101
26.540	0.000	0.00	0.17	0.74	0.091
26.710	0.000	0.00	0.16	0.66	0.081
26.880	0.000	0.00	0.14	0.59	0.073
27.050	0.000	0.00	0.13	0.53	0.065
27.220	0.000	0.00	0.11	0.48	0.059
27.390	0.000	0.00	0.10	0.43	0.053
27.560	0.000	0.00	0.09	0.38	0.047
27.730	0.000	0.00	0.08	0.35	0.042
27.900	0.000	0.00	0.07	0.31	0.038
28.070	0.000	0.00	0.07	0.28	0.034
28.240	0.000	0.00	0.06	0.25	0.031
28.410	0.000	0.00	0.05	0.22	0.028
28.580	0.000	0.00	0.05	0.20	0.025
28.750	0.000	0.00	0.04	0.18	0.022
28.920	0.000	0.00	0.04	0.16	0.020
29.090	0.000	0.00	0.03	0.15	0.018
29.260	0.000	0.00	0.03	0.13	0.016
29.430	0.000	0.00	0.03	0.12	0.014
29.600	0.000	0.00	0.02	0.11	0.013
29.770	0.000	0.00	0.02	0.09	0.012
29.940	0.000	0.00	0.02	0.08	0.010
30.110	0.000	0.00	0.02	0.08	0.009
30.280	0.000	0.00	0.02	0.07	0.008
30.450	0.000	0.00	0.01	0.06	0.008
30.620	0.000	0.00	0.01	0.05	0.007
30.790	0.000	0.00	0.01	0.05	0.006
30.960	0.000	0.00	0.01	0.04	0.005
31.130	0.000	0.00	0.01	0.04	0.005
31.300	0.000	0.00	0.01	0.04	0.004
31.470	0.000	0.00	0.01	0.03	0.004
31.640	0.000	0.00	0.01	0.03	0.004
31.810	0.000	0.00	0.01	0.03	0.003
31.980	0.000	0.00	0.01	0.02	0.003
32.150	0.000	0.00	0.00	0.02	0.003

32.320	0.000	0.00	0.00	0.02	0.002
32.490	0.000	0.00	0.00	0.02	0.002
32.660	0.000	0.00	0.00	0.01	0.002
32.830	0.000	0.00	0.00	0.01	0.002
33.000	0.000	0.00	0.00	0.01	0.001
33.170	0.000	0.00	0.00	0.01	0.001
33.340	0.000	0.00	0.00	0.01	0.001
33.510	0.000	0.00	0.00	0.01	0.001
33.680	0.000	0.00	0.00	0.01	0.001

WATERSHED 'E'

Detention Tank Volume and Outflow (Gateway)									
H (ft)	Length (ft)	Width (ft)	Square Feet (SF)	Area (Acre)	Total Volume (ac-ft)	Total Volume (cf)	Outflow w/30" orifice at basin bottom (cfs)	Outflow w/24" orifice at 3.5ft above bottom (cfs)	Total outflow (cfs)
0	150	150	22500	0.52	0.00	0	0.0	0.0	0.0
0.25	150	150	22500	0.52	0.13	5625	1.0	0.0	1.0
0.50	150	150	22500	0.52	0.26	11250	2.0	0.0	2.0
0.75	150	150	22500	0.52	0.39	16875	3.0	0.0	3.0
1.00	150	150	22500	0.52	0.52	22500	4.0	0.0	4.0
1.25	150	150	22500	0.52	0.65	28125	5.0	0.0	5.0
1.50	150	150	22500	0.52	0.77	33750	10.4	0.0	10.4
1.75	150	150	22500	0.52	0.90	39375	14.6	0.0	14.6
2.00	150	150	22500	0.52	1.03	45000	17.9	0.0	17.9
2.25	150	150	22500	0.52	1.16	50625	20.7	0.0	20.7
2.50	150	150	22500	0.52	1.29	56250	23.1	0.0	23.1
2.75	150	150	22500	0.52	1.42	61875	25.3	0.0	25.3
3.00	150	150	22500	0.52	1.55	67500	27.4	0.0	27.4
3.25	150	150	22500	0.52	1.68	73125	29.3	0.0	29.3
3.50	150	150	22500	0.52	1.81	78750	31.0	0.0	31.0
3.75	150	150	22500	0.52	1.94	84375	32.7	1.0	33.7
4.00	150	150	22500	0.52	2.07	90000	34.3	2.0	36.3
4.25	150	150	22500	0.52	2.20	95625	35.8	3.0	38.8
4.50	150	150	22500	0.52	2.32	101250	37.3	4.5	41.8
4.75	150	150	22500	0.52	2.45	106875	38.7	6.6	45.3
5.00	150	150	22500	0.52	2.58	112500	40.1	9.4	49.5
5.25	150	150	22500	0.52	2.71	118125	41.4	11.5	52.9
5.50	150	150	22500	0.52	2.84	123750	42.7	13.2	55.9
5.75	150	150	22500	0.52	2.97	129375	43.9	14.8	58.7
6.00	150	150	22500	0.52	3.10	135000	45.1	16.2	61.3
6.25	150	150	22500	0.52	3.23	140625	46.3	17.5	63.8
6.50	150	150	22500	0.52	3.36	146250	47.4	18.7	66.1
6.75	150	150	22500	0.52	3.49	151875	48.5	19.9	68.4
7.00	150	150	22500	0.52	3.62	157500	49.6	20.9	70.5

WATERSHED 'E'

Rating Table for Circular Orifice - 3

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	7.000 ft
Centroid Elevation	1.250 ft
Tailwater Elevation	0.000 ft
Discharge Coefficient	0.526
Diameter	30.0 in

Headwater Elevation (ft)	Discharge (cfs)	Velocity (ft/s)
0.000		(N/A)
0.250		(N/A)
0.500		(N/A)
0.750		(N/A)
1.000		(N/A)
1.250		(N/A)
1.500	10.35	2.11
1.750	14.63	2.98
2.000	17.92	3.65
2.250	20.69	4.22
2.500	23.13	4.71
2.750	25.34	5.16
3.000	27.37	5.58
3.250	29.26	5.96
3.500	31.04	6.32
3.750	32.72	6.67
4.000	34.31	6.99
4.250	35.84	7.30
4.500	37.30	7.60
4.750	38.71	7.89
5.000	40.07	8.16
5.250	41.38	8.43
5.500	42.66	8.69
5.750	43.90	8.94
6.000	45.10	9.19
6.250	46.27	9.43
6.500	47.41	9.66
6.750	48.53	9.89
7.000	49.62	10.11

WATERSHED 'E'

Rating Table for Circular Orifice - 3

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	7.000 ft
Centroid Elevation	1.000 ft
Tailwater Elevation	0.000 ft
Discharge Coefficient	0.526
Diameter	24.0 in

Headwater Elevation (ft)	Discharge (cfs)	Velocity (ft/s)
0.000		(N/A)
0.250		(N/A)
0.500		(N/A)
0.750		(N/A)
1.000		(N/A)
1.250	6.62	2.11
1.500	9.36	2.98
1.750	11.47	3.65
2.000	13.24	4.22
2.250	14.81	4.71
2.500	16.22	5.16
2.750	17.52	5.58
3.000	18.73	5.96
3.250	19.86	6.32
3.500	20.94	6.67
3.750	21.96	6.99
4.000	22.94	7.30
4.250	23.87	7.60
4.500	24.78	7.89
4.750	25.65	8.16
5.000	26.49	8.43
5.250	27.30	8.69
5.500	28.09	8.94
5.750	28.86	9.19
6.000	29.61	9.43
6.250	30.34	9.66
6.500	31.06	9.89
6.750	31.76	10.11
7.000	32.44	10.33

APPENDIX 7

Existing Condition 25-Year Storm Hydrology Map

HYDROLOGIC SOIL GROUP: "A", "B", "C", & "D"

LEGEND

(solid blue line)	MAJOR DRAINAGE BOUNDARY
(dashed blue line)	SUB-DRAINAGE BOUNDARY
(dashed grey line)	SOIL TYPE BOUNDARY
(light line)	OFFSITE DRAINAGE BOUNDARY (PER TTM 19179)
(light dashed line)	OFFSITE SUB-AREA BOUNDARY (PER TTM 19179)
L=XXX'	FLOWLINE AND FLOWLINE LENGTH
A	SUBAREA DESIGNATION
1.2	SUBAREA (ACRES)
10	NODE NUMBER
Q25	CALCULATED RUNOFF FOR 25 YR FREQ.
Q2	CALCULATED RUNOFF FOR 2 YR FREQ.
Tc	TIME OF CONCENTRATION
Ls	FLOW PATH LENGTH (SURFACE)
Lp	FLOW PATH LENGTH (PIPE)
COI	CITY OF IRVINE

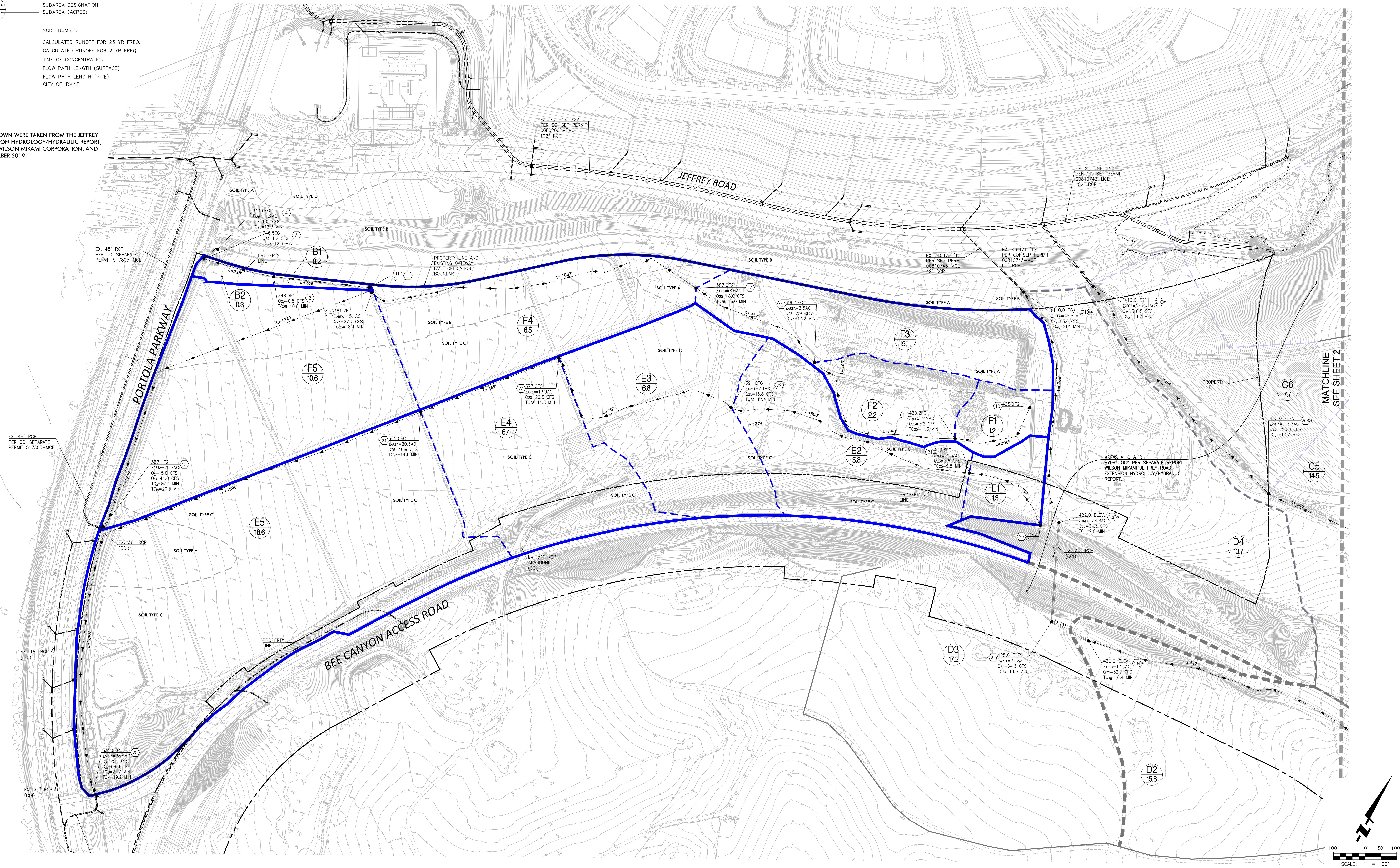
NOTE:
(*) VALUES SHOWN WERE TAKEN FROM THE JEFFREY ROAD EXTENSION HYDROLOGY/HYDRAULIC REPORT, PREPARED BY WILSON MIKAMI CORPORATION, AND DATED SEPTEMBER 2019.

EXISTING CONDITION

NODE	SUBAREA	AREA (AC)	Q_{25} (CFS)	T_{C2} (MIN)	25-YR VOLUME (AC-FT)
3	B	0.5	1.1	13.3	4.01
15	F	25.6	44.0	20.5	
25	E	38.9	69.9	19.2	
	REMAINING*	34.9			
TOTAL		99.9	115.0	-	

* INCLUDES THE REMAINING AREA WITHIN THE PROPERTY LINE AND OUTSIDE OF THE MAJOR BOUNDARIES.

TOTAL WATERSHED BOUNDARY = 63.3 ACRES



REVISIONS					
NO.	INIT.	DATE	DESCRIPTION	APP'D	DATE

FUSCOE ENGINEERING
15535 Sand Canyon Ave, Suite 100
Irvine, California 92618
949.474.1960 fuscoe.com

GATEWAY VILLAGE

EXISTING HYDROLOGY MAP

JOB NO. 308-092

DRAWN BY: JZ

SHEET 1 of 2

F:\Projects\308\092_Support Files\Reports\Hydrology\Preliminary Hydrology\Hydrolo

APPENDIX 8

Proposed Condition 25-Year Storm Hydrology Map

HYDROLOGIC SOIL GROUP: "A", "B", "C", & "D"

LEGEND

- MAJOR DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY C
- SUB-DRAINAGE BOUNDARY D
- SUB-DRAINAGE BOUNDARY E
- SUB-DRAINAGE BOUNDARY F
- SOIL TYPE BOUNDARY
- DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
- SUB-DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
- FLOWLINE
- DETENTION BASIN
- A / 1.2 — SUBAREA DESIGNATION / SUBAREA (ACRES)
- 10 — NODE NUMBER
- Q25 — CALCULATED RUNOFF FOR 25 YR FREQ.
- Tc — TIME OF CONCENTRATION
- L — FLOW PATH LENGTH (SURFACE)
- COI — CITY OF IRVINE

NOTE:
(*) VALUES SHOWN WERE TAKEN FROM THE JEFFREY ROAD EXTENSION HYDROLOGY/HYDRAULIC REPORT, PREPARED BY WILSON MIKAMI CORPORATION, AND DATED SEPTEMBER 2019.

REVISIONS					
NO.	INIT.	DATE	DESCRIPTION	APP'D	DATE

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15535 Sand Canyon Ave, Suite 100
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949.474.1960
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GATEWAY VILLAGE

PROPOSED HYDROLOGY MAP

JOB NO. 308-092

DRAWN BY: JZ

SHEET 1 of 1

APPENDIX 9

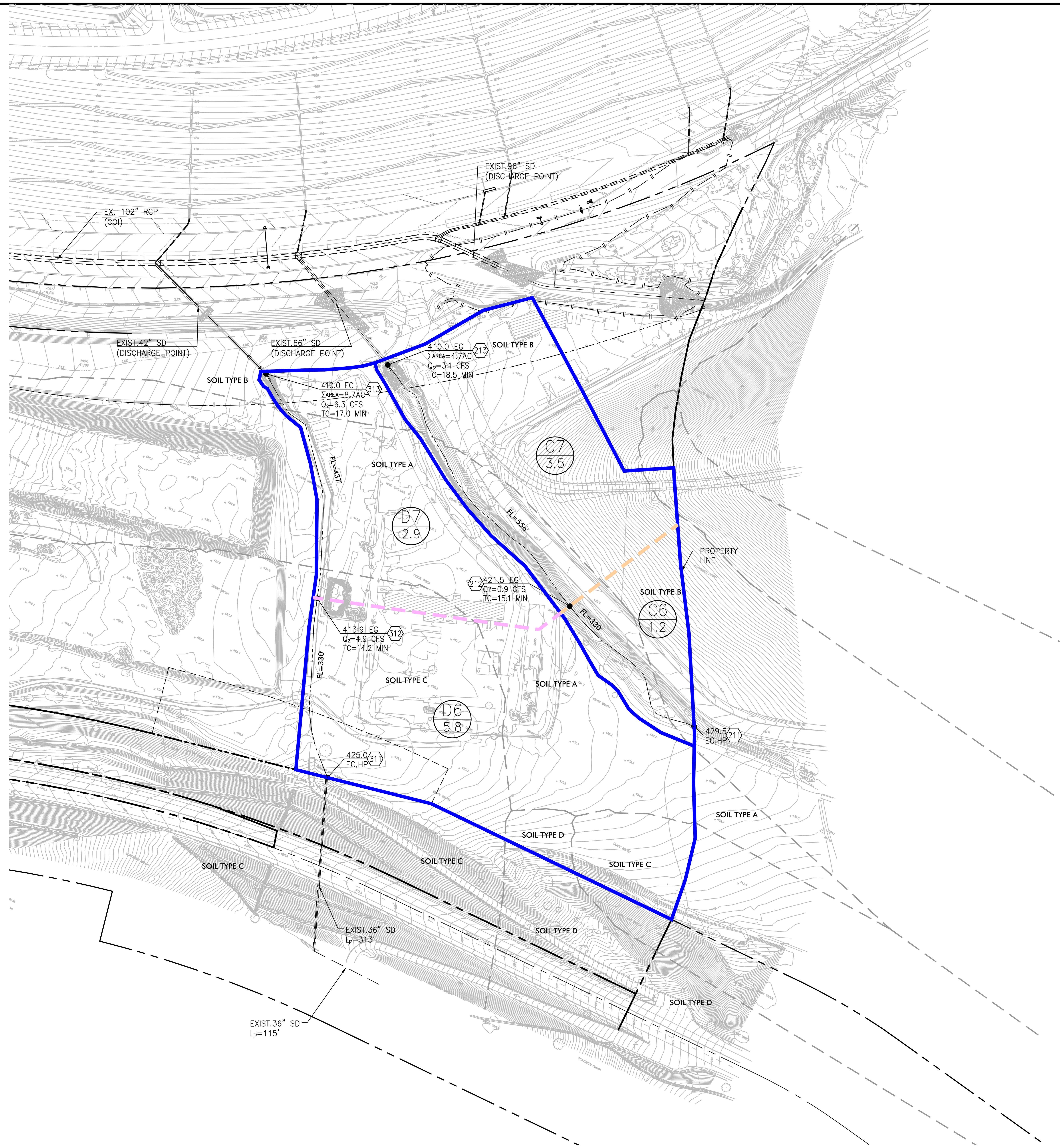
Existing Condition 2-Year Hydromod Map for Watersheds ‘C’ & ‘D’

HYDROLOGIC SOIL GROUP: "A", "B", "C", & "D"

LEGEND

- MAJOR DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY 'C'
- SUB-DRAINAGE BOUNDARY 'D'
- SOIL TYPE BOUNDARY
- DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
- SUB-DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
- FLOWLINE
- A — SUBAREA DESIGNATION
- 1.2 — SUBAREA (ACRES)
- 10 — NODE NUMBER
- Q2 — CALCULATED RUNOFF FOR 2 YR FREQ.
- Tc — TIME OF CONCENTRATION
- L — FLOW PATH LENGTH (SURFACE)
- COI — CITY OF IRVINE

NOTE:
(*) VALUES SHOWN WERE TAKEN FROM THE JEFFREY ROAD EXTENSION HYDROLOGY/HYDRAULIC REPORT, PREPARED BY WILSON MIKAMI CORPORATION, AND DATED SEPTEMBER 2019.



REVISIONS					
NO.	INIT.	DATE	DESCRIPTION	APP'D	DATE

FUSCOE ENGINEERING
15535 Sand Canyon Ave, Suite 100
Irvine, California 92618
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GATEWAY VILLAGE

EXISTING HYDROMOD MAP FOR WATERSHED 'C' & 'D'

JOB NO. 308-092

DRAWN BY: JZ

SHEET 1 of 1

F:\Projects\308\092_Support Files\Reports\Hydrology\Preliminary Hydrology\Hydrology Maps\308-092-xh-Existing 2 yr Hydromod Map.dwg (12/5/2024 5:26 PM) Plotted by: Brandon Muse

APPENDIX 10

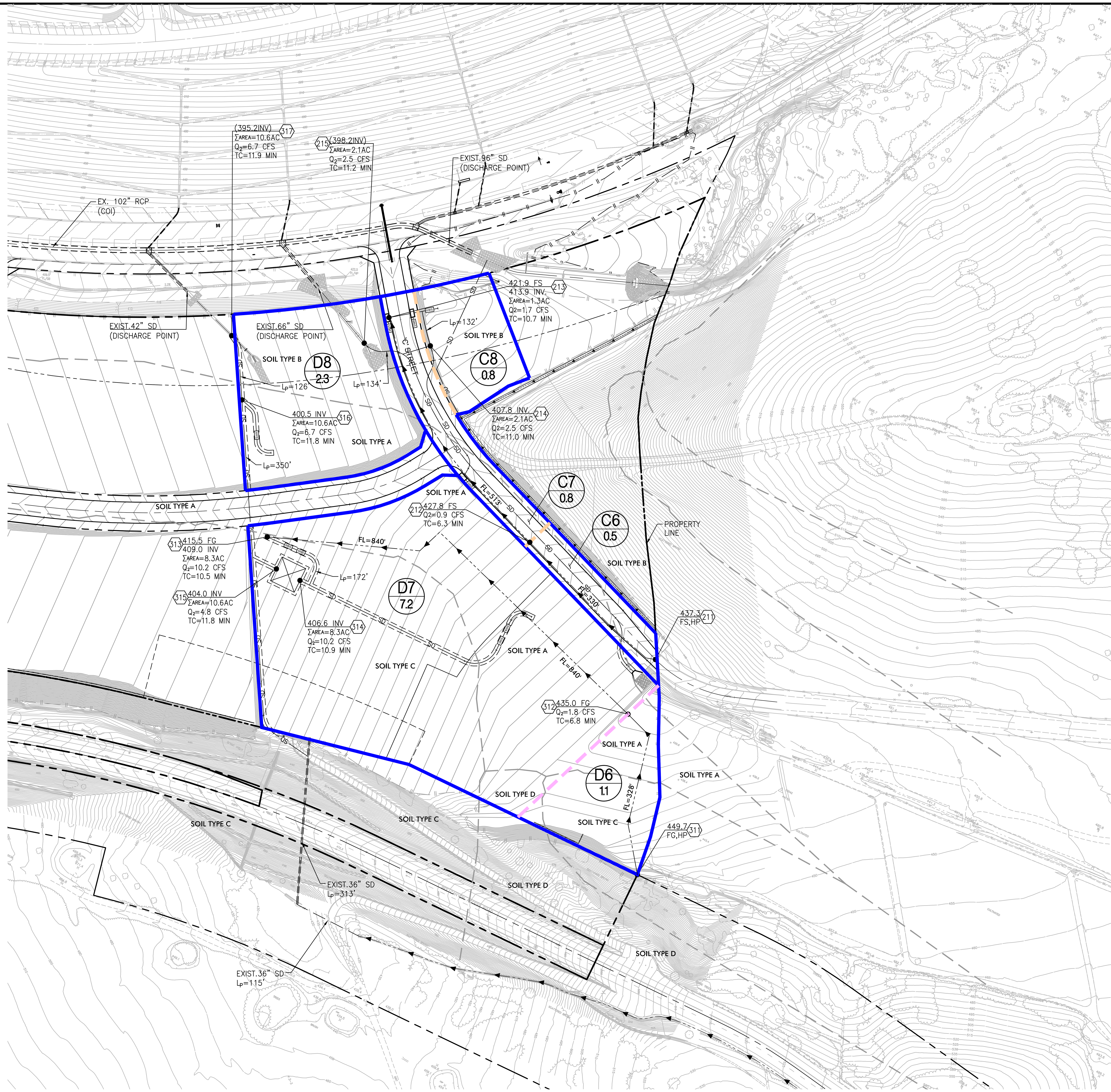
Proposed Condition 2-Year Hydromod Map for Watersheds 'C' & 'D'

HYDROLOGIC SOIL GROUP: "A", "B", "C", & "D"

LEGEND

(solid blue line)	MAJOR DRAINAGE BOUNDARY
(orange dashed line)	SUB-DRAINAGE BOUNDARY 'C'
(pink dashed line)	SUB-DRAINAGE BOUNDARY 'D'
(grey dashed line)	SOIL TYPE BOUNDARY
(light purple line)	DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
(light purple dashed line)	SUB-DRAINAGE BOUNDARY (PER WILSON MIKAMI REPORT)
(arrowed dash line)	FLOWLINE
A	SUBAREA DESIGNATION
1.2	SUBAREA (ACRES)
10	NODE NUMBER
Q2	CALCULATED RUNOFF FOR 2 YR FREQ.
Tc	TIME OF CONCENTRATION
L	FLOW PATH LENGTH (SURFACE)
COI	CITY OF IRVINE

NOTE:
(*) VALUES SHOWN WERE TAKEN FROM THE JEFFREY ROAD EXTENSION HYDROLOGY/HYDRAULIC REPORT, PREPARED BY WILSON MIKAMI CORPORATION, AND DATED SEPTEMBER 2019.



100' 0' 50' 100'
SCALE: 1" = 100'

REVISIONS					
NO.	INIT.	DATE	DESCRIPTION	APP'D	DATE

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GATEWAY VILLAGE

PROPOSED HYDROMOD MAP FOR WATERSHED 'C' & 'D'

JOB NO. 308-092
DRAWN BY: JZ
SHEET 1 of 1

F:\Projects\308\092_Support Files\Reports\Hydrology\Preliminary Hydrology\Hydrology Maps\308-092-xh-Proposed 2 yr Hydromod Map.dwg (12/5/2024 5:22 PM) Plotted by: James Zacher

APPENDIX 11

Hunsaker Hydrology Map for T.T. 16927 – PA-9B, PA-9C2

EXHIBIT 2
OFF-SITE HYDROLOGY MAP
for ROUGH GRADING
T.T. 16927 - PA-9B, PA-9C2
PHASE I
City of Irvine